National Ignition Facility Monthly Status Report—February 2000

Ed Moses

February 29, 2000

Lawrence Livermore National Laboratory

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NATIONAL IGNITION FACILITY
MONTHLY STATUS REPORT SUMMARY
FEBRUARY 2000

Project Name:	National Ignition Facility	Building No.	581, 681 at LLNL	
NNSA Line Item No.:	96 D - 111	**Project Manager:**	E. I. Moses	925-423-9624 925-423-2612 (fax)
Budget & Reporting No.:	39 DP 02 (PACE) DP 0213 (OPC)	**System Engineer:**	M. L. Spaeth	925-424-4940 925-422-4667 (fax)
Funding Source:	Weapons Stockpile Stewardship – ICF	**Program Sponsor:**	C. J. Keane	301-903-4323
Original Funding Year:	’96 (first quarter)	**Construction Manager:**	V. S. Roberts	925-424-3662 925-423-7588 (fax)
Project Summary Description:	The Project provides for the design, procurement, construction, assembly, installation, and acceptance testing of the National Ignition Facility (NIF), an experimental inertial confinement fusion facility intended to achieve controlled thermonuclear fusion in the laboratory by imploding a small capsule containing a mixture of the hydrogen isotopes deuterium and tritium. The NIF will be constructed at the Lawrence Livermore National Laboratory (LLNL), Livermore, California as determined by the Record of Decision made on December 19, 1996, as a part of the Stockpile Stewardship and Management Programmatic Environmental Impact Statement.			
Project Justification:	The mission of the National Inertial Confinement Fusion (ICF) program is to achieve controlled thermonuclear fusion in the laboratory. This program supports the National Nuclear Security Administration (NNSA) mandate of maintaining nuclear weapons science expertise required for stewardship of the stockpile, testing of nuclear weapons effects, and the development of fusion power by providing a database for inertial fusion ignition. This mission was identified in the NIF Justification of Mission Need, which was endorsed by the Secretary of Energy. Identification of target ignition as the next important step in ICF development for both defense and nondefense applications is consistent with the earlier (1990) recommendation of NNSA’s Fusion Policy Advisory Committee, and the National Academy of Sciences Inertial Fusion Review Group. In 1995, the NNSA’s Inertial Confinement Fusion Advisory Committee affirmed the program's readiness for ignition experiments. A review by the JASONs in 1996 affirmed the value of the NIF for stockpile stewardship.			
Interfaces with Other Projects	The NIF is a key element of the Stockpile Stewardship Program. It will provide scientific data for secondaries and will complement hydrodynamic tests and material testing for primaries. The NIF will provide data to calibrate ASCI models. Position papers on NIF's role in Stockpile Stewardship are being prepared.			
Risk Management:	The System Engineering group has been organized and chartered to identify and manage risk. Working Groups within this organization include Beampath, Flange to Flange (cleanliness), Alignment, Contamination Control, Laser and Target Area Building (LTAB) lighting, Test Plans, Activation, and Requirements Update.			
Execution & Acquisition Strategy:	The model successfully employed to execute the Conventional Facility will be adapted for the Beampath Infrastructure Systems. This model relies on the services of an Architect/Engineer (A/E) for design and a Construction Management/General Contractor (CM/GC) firm to assist in managing the complex interfaces during installation and the commissioning of construction contracts. The Acquisition Strategy for laser equipment will focus on the use of integrating contractors to the maximum extent possible to achieve the performance specifications and incorporate technology advances.			

Project Manager's February 2000 Progress Report

Summary Status

Category	Last Period	This Period	Projected Next Period
Cost	Major concern	Major concern	Major concern
Schedule	Major concern	Major concern	Major concern
Technical	Satisfactory	Satisfactory	Satisfactory
Overall Project	Major concern	Major concern	Major concern

NIF Project Manager's Assessment

Overall Project Assessment

Major concern due to schedule and cost.

Safety: The Incident Analysis and Construction Management Safety Review Teams were formed to review the January 13, 2000, accident in which a worker received a back injury when a 42-in.-diameter duct fell during installation. One action is to contract DuPont to review the Safety Program.

Technical Status: The general status of the technologies underlying the NIF Project remains satisfactory. The issues currently being addressed are (1) cleanliness for installation, assembly, and activation of the laser system by Systems Engineering; (2) laser glass—a second pilot run at one of the two commercial suppliers is ongoing successfully; and (3) operational costs associated with final optics assembly (FOA) optics components—methods are being developed to mitigate 3ω damage and to resolve beam rotation issues.

Schedule: The completion of the Title II design of laser equipment is now approximately 83% complete. The Beampath Infrastructure System is on the critical schedule path. The procurement strategy was evaluated by commercial construction management and Architectural/Engineering (A/E) contractors with a panel of independent experts, the Beampath Infrastructure System (BIS) Implementation Review Com-

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mittee Advisory Group. The BIS Integration Management and Installation Services (IMI) Subcontractor solicitation package and approach were presented to NNSA Programmatic and Procurement organizations at the end of February. The formal submittal of the solicitation package is planned for early March.

The construction status of the Conventional Facilities at the end of February is 84% complete.

Cost: The NIF Project Total Project Cost (TPC) is $1.2B. The Project has obligated 75% of the TPC funds. The remaining contingency is $18.3M. Because of schedule delays and projected increases in the design, construction management, assembly, and installation of the system infrastructure, cost growth of the TPC is anticipated and will remain a major concern until the budget rebaseline process is completed.

February Rebaseline Activities

The NIF Laboratory Project performed the following key actions in February to rebaseline the Project before June 1, 2000: (1) received and began statusing the approved Rebaseline Plan; (2) received and began statusing the approved Transition Period Implementation Plan; (3) made progress on the rebaseline schedule that forms the basis for the rebaseline cost estimates; (4) initiated implementation of the NIF Steps and Functional System Descriptions as the foundation for the technical, cost, and schedule baselines; (5) presented the solicitation package for the BIS Integration Management and Installation Services to the NNSA Project and Procurement organizations; and (6) continued the new procurement strategies to involve industrial partners and use contractors to design, manufacture, and assemble laser systems using enforceable bid documents, as is currently done in the Conventional Facilities.

Schedule Rebaseline: Inputs to the rebaseline schedule for the first of two completion options (Option IA) have been put into the Integrated Project Schedule (IPS) Primavera system. Logic and consistency reviews, along with reviews of consistency with budget profiles, are nearly complete. This rebaseline schedule forms the bottom-up basis for other completion options and also serves as the basis for the time-phased cost estimate of the NIF completion costs. The schedule was reviewed with NNSA at the 60% Review of rebaselining.

Procurement Strategy: LLNL is reviewing with NNSA the Beampath Infrastructure System soliticitation package to involve industry in the

design, construction, installation, and commissioning of the infrastructure systems.

Independent Reviews: The General Accounting Office (GAO) gave their initial findings to NNSA; the NIF Council Technical Review Committee evaluated technical issues; the Project Performance Review Group examined acquisition strategy; and the UC Project Management Panel reviewed the overall NIF status.

FEBRUARY ACTIVITIES HIGHLIGHTS

Site and Conventional Facilities: The OAB was conditionally accepted by LLNL on the contractors' evidence of substantial completion.

Laser/Optics Systems: The first four production frame assembly units (FAUs) were shipped by the vendor.

Beam Transport Systems: The BIS Integration Management and Installation Services (IMI) Subcontractor solicitation package and approach were presented to NNSA Programmatic and Procurement organizations.

Integrated Computer Control: The test report was issued to complete the cycle for the Flashlight software release.

Optics: A review of revision of all optics drawings for the PAM and PABST were completed.

Target Experimental System: Target chamber post-gunite neutron shielding leak tests are complete. The rotation of the laser beam in the FOA is a problem that has been identified and solved. Design solutions are being implemented.

Operations Special Equipment: The contract for procurement of transporters #2 and #3 are complete.

ES&H and Supporting R&D: The second pilot laser glass production run, at one of the two laser glass suppliers, has produced over 200 laser glass slabs. Preparation for the May 2000 pilot run at the other vendor is on schedule.

MARCH SCHEDULED ACTIVITIES

The major activities scheduled to occur in March are to: (1) submit Option IA rebaseline schedule to NNSA; (2) status the approved Transition Period Implementation Plan and NNSA performance milestones on a weekly and monthly basis; (3) provide the 90% rebaseline status to NNSA Under and Deputy Secretaries; (4) meet with Level 1 and 2 Baseline Change Control Boards; (5) submit the Beampath Infrastruc-

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ture System procurement package to the NNSA; (6) award contract for CSP-17, OAB buildout; and (7) meet with DuPont to begin their review of construction safety.

WBS 1.1 PROJECT OFFICE

ACTIVITIES

Project Office

A major recommendation of the Construction Management Safety Review Team was to bring DuPont on board as a construction safety consultant. They have been contracted and will appear on site in March 2000.

The major Project Office activities were to: (1) implement NNSA-approved NIF Rebaseline Plan, (2) prepare the rebaseline schedule and cost estimates based on the go-forward options, (3) participate in external reviews, and (4) provide weekly, monthly, and quarterly status reports.

A 60% review of the status of rebaselining plan activities was given to NNSA. Topics included current cost and schedule estimates, transition implementation plan, and the Beampath Infrastructure System procurement strategy.

The Transition Implementation Plan covering the key Project activities from October 1999 to June 1, 2000, when the rebaseline process will be completed, has been approved by the NNSA and is being implemented.

The final NIF Rebaselining Plan covering all the activities to rebaseline the integrated project schedule and cost estimate by June 1, 2000, was approved by the NNSA and is being statused weekly. At the end of February, all activities are on schedule.

A series of reviews with NNSA and LLNL Procurement organizations on the solicitation package for the proposed management and installation services for the Beampath Infrastructure System took place. Final submittal will be in March 2000.

Several external reviews occurred in February: (1) GAO initial findings briefing given to NNSA; (2) Meetings held with the UC Vice President of Administration on procurement strategy; (3) Review of technical and management issues with the NIF Council technical subcommittee, John Emmett Chairman, took place; (4) Project Performance Review Group, John Mitchell, Chairman, reviewed acquisition strategy for laser and beampath infrastructure systems; (5) ICF Program managers received status of the rebaselining activity; (6) Independent Cost Estimating team provided their required interim estimate

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update (Rebaseline Plan milestone); and (7) UC Project Management Panel, Bill Friend, Chairman, reviewed NIF status.

Information Systems

PICS, a new problem reporting and action-tracking tool, has been deployed in a limited test mode. Several bugs have been identified and corrected. We are expecting to deploy this tool to a larger set of NIF personnel in March.

System Engineering

A significant portion of the effort in System Engineering guides rebaselining the cost, schedule, and scope of the NIF Project. Some activities here include (1) applying the Functional System Description (FSD) to the NIF baseline plan, (2) reviewing the scope planned in the FSD elements for the various NIF Steps, (3) processing proposed changes through the Change Control Boards (CCBs), and (4) assessing the completeness of the planned scope.

The Project has initiated a major activity to define the NIF Steps and Functional System Description as the basis of the technical, cost, and schedule baselines. Reviews have been conducted in each FSD area.

Configuration Management/Change Control Actions

There was significant activity within the CCBs during this period. The CCB4 initiated twice-weekly standing meetings to review both ECRs and Contingency Transfer Requests (CTRs). In addition, the CCB4 convened daily on an informal basis to review all changes in the rebaselining plan.

The following tables list the actions completed by the Level 4 and Level 3 Change Control Boards in February.

Level 4 Change Control Board Actions:

ECR	Title	Resolution	Cost
750	LM4-LM8 Mirror System–OC Rev	Approved	0 K
1408	Spatial Filter Vessel Kinematic Locator Adjustment Cam	Approved	50K
1410	Add title to WBS 2.8.3.5	Approved	0 K
1457	Modify 3w Calorimeter Chamber by Shortening	Approved	0 K
CTR			
335	Modify TRW Support	Approved	185K
337	Funding for Claim Settlement with CSP-5	Approved	400K
343	Funding for Field Pool for CSP-6/10	Approved	250K
345	Reconciliation of Funding Required to Implement ECR 1282 and Perform Additional PAMMA Cleanroom Work	Approved	88K
346	Independent Assessment of TAB Concrete Cracking	Approved	125K
347	Implement Independent Schedule Review	Disapproved	N/A
348	Reconciliation of Funding Required to Implement BTR 74 PAMMA Cleanroom Construction and MOR Floor	Disapproved	N/A
349	Funding for Field Pool for CSP-6/10	Approved	450K
350	CSP-17 Award and Field Pool	Approved	302K

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Level 3 Baseline Change Control Board Actions:

BCP	Title	Resolution	Date	Cost
011	Clad Internal Surfaces of LM1 and Periscope	Approved	2/3/00	2600K

System Integration

The System Integration group has worked quite extensively to assure the requirements and technical information that form the basis of the Beampath Infrastructure design are correct. This verification will allow the system's designer, Parsons, to rapidly complete the design with the minimum chance of change.

One significant verification activity has been to coordinate and develop simple computer-aided design (CAD) model representations of the Special Equipment line-replaceable units (LRUs), including the interface points. These representations are used for defining the attaching of the utilities (interface control). A representation shows the general outline and attachment points of the LRU in a simple form that can be easily transformed between the different CAD platforms at Parsons and LLNL.

In addition, extensive effort has continued to pin down the requirements and operational modes of the beampath utilities. This effort has facilitated agreements between the designers and customers. The system definition documents are scheduled to be complete in March.

System Performance, Mission, and Risk Analysis

A plan was outlined (Performance Bundle Plan) for the performance optimization of a NIF Beamline (power and energy) after the initial commissioning is complete. The resources and schedule for accomplishing this plan were developed and included in the new baseline.

The status and goals of the NIF modeling efforts were presented to the NIF Council for their review and comment.

System Alignment

The NIF Alignment organization begin the 3-mm Survey Shoot on February 14, utilizing ~35 personnel from ATT Precision Survey, Johnson Controls, and LLNL. The objective was to obtain a snapshot of the survey monuments used to place beampath infrastructure. There are over 900 monuments in the laser bays, switchyards, and target bays. The goal is to obtain a calculated uncertainty of <3 mm 3σ,

which translates into a 97% likelihood that the monument in question is within the 3-mm radius.

Contamination Control

The PCVS (Particle Cleanliness Verification System) for use in the "Frame Assembly Unit" assembly area was completed and is ready for installation. This automated microscope measures surface cleanliness collected on filter paper using a specially designed "swiping tool."

The current Slab Damage effort is investigating the effect of initial substrate contamination or subsurface (polishing) defects as the prime initiator of slab damage. This study looks at initial contamination on samples of polished laser amplifier glass (slab glass) before exposure to flashlamp light using Atomic Force Microscopy (AFM), then exposing the slab glass to various levels of flashlamp illumination and reexamining it under the AFM for atomic-level changes in the surface.

A cleaning decision tree has been developed that describes the logical decisions necessary to prepare a Statement of Work for a procurement action. Precision cleaning is considerably more complex than conventional cleaning following mechanical fabrication. The decision tree addresses issues such as material selection, achieving visibly cleanliness, achieving precision cleanliness, passivation of stainless-steel components and special packaging instructions.

Problems / Impacts / Corrective Actions

None.

Procurements

A procurement action has been initiated to get a Quality Assurance review of the work remaining (e.g., production of line replaceable units, etc.). A procurement for DuPont safety reviewers has been placed by the NIF/ICF Operations Office.

Variances

The rebaseline process has not been completed and, therefore, there are currently no variance statements for FY00 cost or schedule.

Upcoming Major Activities

– Status the approved Rebaseline Plan and Transition Period Implementation Plans.

– Provide the 90% rebaselining review to the Under and Deputy Secretaries.

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– Provide briefings to the Levels 1 and 2 Baseline Change Control Boards.
– DuPont Safety Team to arrive at the NNSA Quality Safety Review.

WBS 1.2 SITE AND CONVENTIONAL FACILITIES

ACTIVITIES

Conventional Facilities work reached 84% completion in February.

Sitework for the month of February included placement of the last communication vaults, backfilling/concrete slurrying, and placement of the concrete pad for the Motor Control Center in the location immediately west of Switchyard 1. The installation of both the communication and electrical ductbanks in the area west of Switchyard 2 began. Work at the Central Plant continued with the execution of a few remaining punchlist repairs. As of February 29, the contractor has turned over the day-to-day maintenance of the chillers to LLNL's Maintenance and Operations.

Progress in the Laser Building included the completion of concrete placement within the Laser Buildings, including the Visitor Center slab, the Visitor gallery to elevator #3, stairs and elevator lobby slabs in Laser Bay 1, and the freight elevator lobbies in Laser Bay 2. In Laser Bays 1 and 2, the installation and taping of drywall continued. Finishing of the pedestals in Laser Bay 1 commenced with the conditioning/priming coat of paint. Finishing of pedestals in Laser Bay 2 was completed. Structural framing for the rails of elevator #1 began. Placement of masonry commenced on the Visitor Center. Pipefitting and electrical work continued on the Mezzanine levels. Air Handling Unit (AHU) 26 was final-tested and started up. Work continued on the AHUs for Laser Bay 2 and Preamplifier Module Maintenance Areas (PAMMAs). In the Laser Building Core Area, finish work continued in the restrooms and installation of the raised floor, T-bar ceiling system, and light fixtures were performed in the Classified Control Room, Strategy, and Computer Rooms. The installation of ductwork began in the PAMMA Room. The corridor wall separating Capacitor Bays 2 and 3 from the Core Area was sheetrocked. Roll-up doors and metal stud framing began in the OAB corridor. Roof membrane installation, impacted by rainy weather, continued at the OAB corridor roof.

The major work in the Target Building involved the installation of the Switchyard 1 Labyrinth elevation 58.50 slab and wall segment from elevation 61.75 to 68.75 and the Target Bay Cylinder elevation 69.75 to 84.50 radius wall segments and radial (spoke) walls. Structural steel pipe support bracing installation continued on level 69.75, as well as shoring and forming for the upcoming Target Bay roof pour in late March. The Target Building also showed progress on the (-) 33.75 level, with the continuation of collimator installation, and on the (-)

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21.75 level and (-) 3.5 level, with the installation of mechanical and electrical utilities. Work in the Diagnostic Building included metal stud framing and drywall, ductwork installation, and electrical rough-in on (-) 33.75; enclosure structural supports, drywall, shaft walls at mezzanine, and framing of mezzanine ceiling on level (-) 21.75; commencement of metal stud framing, continuation of mechanical ductwork, toilet room piping and risers on level (-) 3.5; mechanical and sprinkler piping on level 17.5; commencement of drywall installation, framing of toilet room ceiling, electrical rough-in, and piping risers on level 29.5; elevated release stack assembly, wood nailers, upper duct run, and welding of bent plates at columns on level 50.5; completion of metal siding installation around the building exterior; and commencement of liner panel siding along the elevator shaft.

Work in the OAB continued with the execution of a few physical punchlist repairs, the testing of the fire alarm/smoke detection system, and the collection of final as-built documents. A major OAB milestone was reached February 25 with the acceptance by LLNL on the contractor's "Substantial Completion." Final Acceptance of the OAB is projected for March 31.

Problems / Impacts / Corrective Actions

Congestion surrounding the west side of the site will continue to be the major burden through the winter. Four contractors including Hensel Phelps Construction Corporation (HPCC), Nielsen Dillingham Builders, Inc. (NDBI), Rigging International, and Pitt Des Moines (PDM), are performing various construction activities in the same vicinity. Maintaining access to the building for workers and materials, at the same time as underground utilities are being installed to meet completion dates this winter, continues to require a great deal of coordination.

With the heavy February rains, efforts to enclose the building at the Laser Building-Target Building and Switchyard interfaces continues to be a challenge and a high priority. Completion of the structural steel and decking within the vestibule/elevator machine room areas is critical for protection of the inside finishes. Temporary protection is being utilized to protect building finishes from rain.

PDM's duration within the Target Bay may impact NDBI's ability to meet the milestone of having the Target Building commissioned and turned over to Special Equipment by July 31, 2000.

Schedule slippage in the Target Building due to February rains and congestion of concrete pours and steel erection above elevation 69.75

continues to be a problem. Schedule workarounds and reevaluation of intermediate milestones with NDBI will occur in March. Although it is currently projected that the end dates of the Target Building and Diagnostic Building are not in jeopardy; certain immediate milestones are impacted.

Schedule slippage on the completion of drywall installation in Laser Bay 2 from March 13 to March 31 was caused by the need to install vertical and horizontal control joints along the finish drywalls as requested by Parsons.

All general contractors and their on-site crews utilized the Safe Plan of Action (SPA) form, supplementing the Job Hazard Analysis, with measurable success.

PROCUREMENTS

None planned.

VARIANCES

The rebaseline process has not been completed, and therefore, there are currently no variance statements for FY00 cost or schedule.

UPCOMING MAJOR ACTIVITIES

- The Final Acceptance of OAB (Cleaned & Commissioned), CF555221, is projected to be March 31.
- The placement of the Target Bay roof slab is projected for completion on March 31.
- The commissioning and certification of Control Rooms within the Laser Bay is projected to commence in late March or early April.
- The erection of structural steel framing for the Visitor Center is projected to commence in late March or early April.
- The Laser Bay 1 activities are projected to continue with the installation of the plenum wall in the lower half and the finish painting of concrete pedestals.
- The Laser Bay 2 work is projected to concentrate on the completion of drywall installation and to prepare the concrete floor for epoxy coating.
- The installation of HVAC ductwork will continue within Capacitor Bays 3 and 4.
- The installation of controls and wiring for the HVAC equipment on Mezzanines 2 and 3 will continue.

WBS 1.3 LASER SYSTEMS

ACTIVITIES

Optical Pulse Generation System

In the master oscillator system, stability tests conducted on the first-article process path fiber amplifier chassis displayed that a 10% gain decrease occurs in the initial hours of operation. Apparently the cause is temperature dependence of the polarization in the single-mode fiber that delivers pump diode light to the amplification fibers. Tests are being conducted to verify this and achieve stable performance.

Highland Technology provided a follow-up demonstration of the amplitude modulator chassis fully loaded with impulse generating boards and a newly designed amplifier/summing board. The demonstrated performance was significantly improved compared to last month; however, rise and fall times of the shaped pulses still need to be improved by a factor of two to meet specifications. An upgrade of the amplifier board should improve the gain with reduced ringing, and the crystal oscillator will be upgraded to meet the timing jitter specification. Delivery of the four units is still expected by the end of March.

Analysis of the modulation in the spectral transmission of the isolators used in the master oscillator chassis showed that the source of modulation was a filter, as opposed to waveplates in the assembly. Tilting of the filters by a few degrees eliminates the modulation without affecting transmission. The isolators have been returned to the vendor for reinstallation at the required tilt.

The regenerative amplifier within the Pre-Amplifier Module (PAM) was assembled and aligned with new optical mounts. Pointing stability tests will be conducted in March.

Fault testing on the new Power Conditioning Unit (PCU) for the PAM was successfully completed at Maxwell, and the unit was delivered. The documentation and drawing package is being reviewed for completeness.

The PAM front-end processor (FEP) software was modified, after testing and debugging the new laser diode driver serial communications software controller, to work with the event notification supplied by the multipass amplifier embedded controller.

Amplifier System

The alignment of the rails of the assembly stands in the Building 381 FAU area continued in February. LLNL surveyors were developing the monument system at the end of the month. The alignment of the rails

will be completed in March prior to the preassembly of the first FAU on the stands. The last of the FAU clean transport and installation equipment needed to produce the first-bundle FAU buses arrived in February. Equipment will be assembled and tested during the next few months as the dirty preassembly operations continue in the FAU assembly area. The first test of the transport of a fully loaded FAU bus container was made using the 40-ton straddle lifter after all fixtures were load tested.The air-bearing system was employed to move the fully loaded Main Amplifier enclosure into and out of the FAU assembly area, simulating the completion and storage of the completed assembly.

Amplifier Power Conditioning System (PCS)

Electronic and paper versions of all PCS drawings for CSP 14B were submitted this month. The last set was transmitted on February 28. Design revisions to the cable enclosures will be submitted in late April.

The bank module emulator for testing the PCS control system was completed. The emulator and embedded controller system under test operated properly during initial tests.

Problems / Impacts / Corrective Actions

The first deliveries of the breadboards for the Pre-Amplifier Beam Transport System (PABTS) were not delivered by the end of the month as required in the contract and are projected by the vendor to be two months late. It was determined that the most feasible method to receive breadboards as required for CSP-13 is to descope the existing contract and solicit other vendors to pickup the balance. The present contract is valued at $1.5M, half of which is now being planned to be rebid.

Nonvolatile residue and particle-generation tests have been completed on a full-scale amplifier FAU casting (reported previously). Plans to eliminate porosity in the FAU castings using a hot-isostatic-press (HIP) are on hold indefinitely. The engineering team has completed its evaluation and is writing a final report for concurrence by Systems Engineering. This will continue to be reported as a problem until concurrence is obtained.

Procurements

The procurement review was completed for the Ultra-Trigger fiber amplifier chassis. The procurement strategy will be build-to-print, fixed price, and best-value competitive bid. The drawing package, statement of work, assembly procedure, and preshipment performance

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characterization procedure are in final stages of preparation for a Request for Quote (RFQ) by the end of March. A one-month bidding cycle is planned, with delivery of the first unit three months ARO. Several potential suppliers have responded favorably to the inquiry-of-interest letter.

The procurement package for the PAM is near completion. The drawing package is in the print room, and the documentation package, which consists of about 40 documents, is within a few days of completion. It was determined that the PCU would be procured separately from the PAM. Discussions have started to develop that PCU procurement strategy.

Bids for the large-aperture Faraday rotators were received and evaluated on a best-value basis. The successful bidder was also the low-cost bidder. The low bid was about 25% higher than our initial estimate. The contract calls for the manufacture of first-article rotators for PAM and PABTS in FY00 at a cost of $185K, with options for production quantities. Overall, this is a $2.5M procurement.

The first four production 4 × 2 FAUs were shipped by General Tool Company in February. This provides sufficient parts for cleaning verification and preassembly activities. The remaining four FAUs needed for the first bundle will be shipped in March and April.

Phase V of the off-site cleaning contract with Astropak began with the placement of task orders to clean the kinematic mounts and blast-shields for the first bundle. The completion of Phase IV, verification of cleaning techniques of large components, will be delayed a few months due to hardware delays. The cleaning of the first-article FAU went reasonably well for a first try, but the process must be improved during the final cleaning to meet the stringent contamination specification.

The first 10 NIF production flashlamps were received from Perkin Elmer about three months ahead of schedule. Inspection and electrical testing will occur at LLNL early in March. The production prototype of the insulated FAU top-plate at Everson Electric did not release from the mold properly. There will be a few weeks delay as the mold is modified. We are currently evaluating workarounds and schedule acceleration at the vendor, but could incur a delay in delivering the first-bundle FAU buses to the storage facility.

Maxwell Technologies (now a division of General Atomics) has been released to begin production of the main charging power supplies for the NIF. Maxwell performed tests to demonstrate that the power sup-

plies could survive short-circuit operation under the normal operating conditions defined in the specification.

Testing began on four Maxwell Technologies capacitors that contain materials from a different source from those used in the component qualification tests. This testing is the beginning of the process to permit the vendor to use alternate materials to avoid schedule problems with the contract in case the primary material source becomes problematic.

VARIANCES

The rebaseline process has not been completed and, therefore, there are currently no variance statements for FY00 cost or schedule.

UPCOMING MAJOR ACTIVITIES

- Continue cost estimating, detail budget planning, development of Cost Account Plans (CAPs), and overall project rebaseline planning.
- Complete first-article PAM RFQ and distribute to potential vendors.
- Install an FAU on the rail in the B381 assembly facility.
- Begin testing the alignment cassette insertion hardware and blastshield insertion hardware.

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WBS 1.4 BEAM TRANSPORT SYSTEMS

ACTIVITIES

Integrated activities to achieve new procurement strategies to involve industrial partners in the Beampath Infrastructure System (BIS) continued. The BIS Integration Management and Installation Services (IMI) subcontractor solicitation package and approach were presented to NNSA Programmatic and Procurement organizations at the end of February. The formal submittal of the solicitation package is planned in early March. (This activity is common to WBS 1.8 as well).

Spatial Filter Vessels / Enclosures

Spatial Filters: One new Transport Spatial Filter (TSF) center vessel (unit 3 of 4) was received. No new Spatial Filter end vessels were received as the fabricator again slipped schedule. Final deliveries on the end and TSF center vessels are now expected in April 2000 as both vendors slipped final deliveries. At the end of February, 206 of 240 circular beam tube assemblies had been received, and delivery completion is expected in mid-March. At the end of February, 105 of 192 rectangular beam tubes were on-hand with delivery completion expected in April.

The first production unit inspection of the Tower Kinematic Mount Bellows has been conducted at the fabricator (Hyspan). The unit failed due a bellows weld leak. Following corrective actions, the inspection will be repeated in March. In addition, one flange O-ring groove will be modified, by ECR, for ease of manufacture.

Laser Bay Interstage Enclosures (LBIE): A Procurement Review for the LBIEs was held in February. Release for Bid is expected in early March after comments have been incorporated into drawings and specifications. The performance of the SF3 Interstage LRU Docking Frame fabricator (Major Tool) has increased substantially in February, largely due to a project management change on their part. The third unit was received on schedule in February, and the fourth is expected in early March. Current schedule is for two clusters (8 units) to be delivered by early May, substantially earlier than the late June date expected last month. The RFQ process on the Laser Building/Switchyard/Target Building bellows assemblies first articles was initiated. The vendor interaction, fabrication, and testing of these first articles is required to move the remaining bellows designs forward to meet all design and project requirements.

Switchyard (SY) Enclosures: Yuba City Steel Products Co. satisfactorily completed the first-article inspection of the SY straight enclosures

in mid-February. Redesign of the enclosure elbows to accommodate a bellows on the 45° face is planned for review and release to bid in *early April.*

Ghost Mitigation: An RFQ package for the remaining beam tube "megaphone-style" ghost mitigation hardware is expected to be issued in mid-March. Installation of the spatial filter ghost mitigation towers is being added to the CSP-16 Scope of Work documents.

Roving Mirror Diagnostic Enclosure (RMDE), Optic Mounts, and Gate Valve: Roving Mirror optic mount stability analyses continued. These analyses indicate that the structure and support system provide the maximum stiffness achievable with the current kinematic support arrangement. Analyses are not final since the LRU (part of the Roving Mirror Assembly [RMA] system) design and properties are not yet available to incorporate into a complete evaluation. SY Gate Valve design continues to address manufacturability, installation, and usage mode issues. ECR 1119 requires incorporation of a beam block function into the Gate Valve along with remote operation capability. A plan to prototype the Gate Valve drive system for contamination control and performance was developed along with a qualified bidders list for the prototype.

Subassembly and Preparations of Government Furnished Equipment (GFE): In February, 12 round beam tube bundles were precision cleaned, bringing the total cleaned to 43 (out of 240). CSP-12 preinstallation work continued on spatial filter end vessels in preparation for precision cleaning. Work began on the Cavity Spatial Filter (CSF) center vessels. One CSF was precision cleaned, and the clean assembly completed. A second CSF was in progress at month's end.

Auxiliary Subsystems

Laser Bay Utilities and Beampath Construction Package: The Parsons contract was signed on February 8. This covers the CSP-14, 15, and 18 scope of work.There is a list of 355 deliverables, such as drawings, calculations, piping and wiring diagrams, tables, and 3D models, that LLNL must deliver to Parsons to enable them to do the work. This list of 355 translates into 521 milestones on their schedule. At the end of February, approximately 50% had been delivered in time, which prevented affecting Parsons' schedule.

In support of these contract deliverables, Systems Engineering has developed the system requirements to give to Jacobs Engineering for incorporation into the Auxiliary Systems piping and instrumentation diagrams (P&IDs). Changes to these systems identified by the review process will be incorporated into the P&IDs before design activities on

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these systems are restarted. Industrial controls wiring diagrams and rack layout drawings are being checked and corrected, as are the cable schedule, instrument list, and wiring diagrams. Simplified representations of the LRU models have been generated by the Integration Group/LRU owners and inserted into the Intergraph 3D model to enable Parsons to efficiently route and land the LRU cables and develop the required electrical plans and details directly from their Intergraph system.

Support Structures

Switchyard Structures: SY1 shop drawings and Requests for Information (RFIs) continue to be received and are being reviewed so that the construction can proceed on schedule. The SY1 and SY2 Pro-E models are being updated to reflect the incorporation of RFIs and fabrication changes. Parsons continues to receive updates to correctly locate utilities and equipment for the CSPs. SY1 fabrication continues at Coast-AGRA, and installation is ongoing. Approximately 100 shop drawings were reviewed in February.

Laser Bay Structures: Concrete placement is complete for all of the Laser Bay 1 and 2 concrete pedestals. The location of the embedded plates have been surveyed by the contractor and the results, although many are somewhat out of tolerance, found acceptable for the standard nonpenetration plates. The plates with penetrations through concrete at LB2 TSF center vessel concrete pedestal were found to be improperly located. These penetrations (for the TSF injection beams) were surveyed by LLNL surveyors. The results of this second survey were still under review at month's end. All four periscope cluster structural support units have been delivered. Changes to the bottom enclosure plates for the LM2 and plasma electrode Pockels cell (PEPC) have been requested in an ECR by Transport and Handling. Martinez & Turek has begun fabrication. This change does not effect the construction schedule.

An ECR to clad the interior flame-sprayed surfaces of the Periscope and LM1 support structures with stainless-steel sheet was presented to the Level 4 and Level 3 Change Control Boards in mid-January. The aluminum surface is quite porous, and high-pressure washing of these surfaces continues to dislodge aluminum particles even after repeated washings. Following their approval, detailed design was begun. A formal design review was held on February 16 with no major action items generated. Vendor pre-bid qualification was conducted in parallel with Procurement. Tentative schedules and installation sequences were developed with the CSP-13 design staff to minimize schedule impacts

on the installation. The target RFB date for the contract is March 24, following a Procurement Review on March 17.

CSP-12 inspection of the Periscope Support structure PEPC frame assembly LRU openings found them to be undersized based on the current PEPC LRU design. This affects all twenty-four LRU openings in the four PEPC frames. An ECR for remachining of these openings is being prepared for review in early March.

Fabrication of the periscope bottom enclosure plates (Process Equipment) has started. This fabrication is on schedule, with first-article inspection in March.

Hogan Manufacturing completed delivery on the Injection Laser System (ILS) Modifications to the preamplifier support structure (PASS) in February, on schedule.

Optical Mounts

Progress continued on design completion and procurement of the structure-mounted hardware, which is the interface between the structural frames/beam enclosures in the laser bays and the switchyards, target area, and optical mount LRUs.

Hardware cleaning, assembly, “kitting,” and delivery inspections have been completed for the first and second clusters’ hardware for the LM1 kinematic mounts being fabricated by Liberty Machine. First article fabrications of the LM1 electrical panels were inspected and approved (Gregory Associates). A problem was encountered from the precision cleaning subcontractor; a new subcontractor has now been engaged. The delivery of the first cluster of hardware is still projected for the end of March. The LM1 utility panels and pneumatic mount actuators for LM1–3 are being fabricated by Electrol Manufacturing Co. The majority of the cleaned pneumatic cylinders (>90%) have been delivered to the manufacturer.

The procurement package for the LM2 and LM3 kinematic mounts for CSP-16, which was scheduled to go out to bid in January, has been delayed further. Minor issues (e.g., dimensional inspection of as-fabricated periscope structure and cleaning notes) and other priorities are the cause of the delay. The expected delivery date for this hardware is still consistent with the CSP-16 schedule (February 2001).

A procurement review for the LM2/3 electrical panels (needed for CSP-16) was held in mid-February. A procurement review for the spatial filter kinematic locator gas covers (also needed for CSP-16) was held in the latter part of February. These covers provide a gas barrier

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for the kinematic locators. Both of these RFPs should go out in March; contract awards are expected in April.

The preliminary design for the LM7 and LM8 LRUs has been completed; this redesign was to address the optical change associated with the wedged lens and beampath redesign in the target area. A preliminary CAD model has been completed for LM8; the revision work on the LM7 model has begun.

PROBLEMS / IMPACTS / CORRECTIVE ACTIONS

The TSF center vessel vendor (STADCO) has placed the job under new management and is in contact with the technical representative at least twice a week. The third (of four) unit was delivered in February. Delivery of the final unit is still expected by the end of March. The delay is not expected to impact construction installation progress, but will require additional manpower to perform vessel hardware installations and cleaning in the next few months. The Spatial Filter End Vessel fabricator (Ranor) continued to slip their schedules by another few weeks in February due to poor welder performance and low staffing. The thirteenth vessel delivery has slipped from February to mid-March. The final two vessels are not expected until mid- to late April. Conversations with the Ranor management continue, and they may shift manpower from the rectangular beam tube welding to the vessels since the vessels are required earlier.

RMA interface changes continue to impact the RMDE mount design. Key aspects of RMA design, construction requirements, and installation affecting the RMDE need to be completed and incorporated into CSP-19.

The first spatial filter end vessel showed signs of free-iron contamination after gross cleaning. The concern was the evolution of loose rust on the interior beamline surfaces over the life of the vessel that could migrate and damage optics. Consultation with LLNL and off-site corrosion experts indicated that surface contamination of stainless steel during fabrication is a frequent occurrence in shops that work with both mild steel and stainless steel. The consultants recommend that stainless-steel parts produced under these conditions have a surface acid etch, similar to that described in ASTM A380, performed prior to precision cleaning. Identification of beamline components and LRUs effected by this problem is under way to support an ECR for funding to perform the required surface treatment. The ECR is expected to be presented to the CCB in March. This was delayed due to work on the Periscope/LM1 cladding ECR.

See the beam rotation problem described in WBS 1.8. Approval of optical design change (i.e., wedged lens) and associated requirements/specifications changes are needed for engineering activity to proceed for LM6–8 structure-mounted hardware and LRU designs.

See the beam rotation problem described in WBS 1.8. Optical design changes, the mirror layout, and associated requirements/specifications changes are occurring. The redesign and engineering activity for LM6–8 LRUs is proceeding successfully.

PROCUREMENTS

The deliveries for LM1 structure-mounted hardware are on or ahead of CSP required dates.

VARIANCES

The rebaseline process has not been completed, and therefore, there are currently no variance statements for FY00 cost or schedule.

UPCOMING MAJOR ACTIVITIES

– Submit the BIS Integration Management and Installation Services (IMI) Subcontractor solicitation package for NNSA review and approval in early March.

– Continue work for completion of Title II GFE and CSP designs and place orders for most of the remaining Beampath Systems GFE under this WBS.

– Continue deliveries and construction of vessels, structures, and beam tubes.

– Carry out GFE preparation activities to complete the SF end and center vessel assembly and cleaning.

– Install SF Tower Support Table kinematic actuators to support construction.

– Release for Bid the following items in March:

  • TSF Extension/Injection Tubes with an estimated value of $300K.

  • Ghost Mitigation Hardware for beam tubes with an estimated value of $350K.

  • Laser Bay Interstage Enclosures with an estimated value of $1100K.

  • Periscope and LM1 Support Structure Stainless Steel cladding with an estimated value of $2200K.

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- Receive first two clusters worth of LM1 kinematic mount hardware in March; balance due in April.
- Receive first clusters worth of LM1 electrical panel hardware in March.
- Release LM2/3 kinematic mount hardware and gas cover RFPs in March; award expected in April.
- Continue transport mirror mount LRU redesign—activity is now shifting to detail design.

WBS 1.5 INTEGRATED COMPUTER CONTROL

ACTIVITIES

Software Release Testing: A test summary report, NIF-0043959, was issued to complete the test cycle for the Flashlight software release. Upon test completion, the test team followed up with developers to closeout test incidents that are documented in the summary report. Procedures are now being written to test software modifications and new functionality that will be delivered in the upcoming front-end integrated system test (FEIST, version 1.5) interim release in March 2000. Tests of the master oscillator, PAM, PCU, integrated timing system, automatic alignment system, and laser diagnostic controls will be performed.

Front-End Integrated System Test: Development of FEIST-1.5 functionality was completed in February 2000, and the process of deploying the product into the testbed was started. New supervisor functions delivered to test are principally device controls and broad-view graphic user interfaces (GUI) for the preamplifier module.

Upgrades to eight FEP included new GUI control panels for timing, master oscillator, preamplifier as well as several new devices, exception handling, and bug fixes. Motor range limit checking and stops were added to the alignment controller and new firmware was developed for the laser energy photodiode controller. Shot capture capability and a Java-based viewer are under development for the video FEP.

Additional FEP Software Progress: The power-conditioning FEP was demonstrated with a Java GUI running test hardware and also interfaced to a bank module emulator developed by Sandia. The Hartmann sensor and deformable mirror FEPs were successfully demonstrated in closed-loop control for a single beam in the wavefront lab; this test illustrated that conversion of older C code to Ada95 code is working very well both in terms of performance and ease-of-integration.

Software Configuration Management: The configuration management function is responsible for delivering a complete and consistent set of Integrated Computer Control System (ICCS) products into both the Alignment Laboratory where input sensor package testing will continue, and into the ICCS testbed where the independent test team will validate the software. A quality control checklist of 16 markers guides the post-development activities needed to deploy a software product into the computer system for test. Completion of the checklist assures that all computer software configuration items (CSCI) inter-operate from the same database, all use the same framework services, and all

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are built without error diagnostics from the compiler. Each CSCI is self-identifying so that an audit trail connects each with the source code that built it, and all sources are frozen into the baseline release configuration.

Supervisory Software: The system manager framework was enhanced to condense the start-up of the many programs that constitute a release into a single script; in the previous release there were 60 individual scripts. The data file parser was upgraded to parse extended markup language (XML) files. A thick binding to the publicly available XML parser was built. An interface to request status of all processes was added.

A standardized Java package hierarchy for the GUI framework was established. A web-based Java documentation tree that allows easy navigation of the Java source code was generated using a commercial tool. Additions were made to the framework including display of exception messages, additional data formatting, and enhanced error handling. Multi-threaded programming is being investigated to resolve the issue of GUI code-blocking execution until CORBA messages return (e.g., from remote devices attached to an FEP).

Scripts were written to perform daily backup of the configuration database (the database that describes the devices connected to the control system). A device deployment report was developed, and validation tables were created. Database tables, data entry forms, and interface software were added to support the preamplifier supervisor and master oscillator FEP.

Timing Delay Generator: Test equipment was assembled and used to validate full functionality and long-term stability of two first-article delay generators. Jitter was measured to be less than 5 ps for all channels, and drift was less than 17 ps. The drift in delay time was largely correlated with temperature variation having a coefficient measured to be 4 ps per °C. All measurements are well within NIF specifications.

Automated Software Testing Tool: Evaluation of the leading automated test tool was completed in February 2000 with assistance from the LLNL Software Technology Center. Several compatibility issues were identified that will be reviewed with the tool vendors. The use of automated test tool technology is planned for regression testing of incremental software builds beginning in 2003.

Industrial Controls: Approximately 80% (~800 sheets) of the interconnect wiring diagrams for the safety interlock system have been completed; back-checking is about 50% complete. Final submission to

Parsons for inclusion in the construction contract will be in early April 2000. Work was started to update the target area vacuum system control interconnect drawings (~200 sheets). These drawings are expected to be complete and checked by the end of March 2000. The vacuum system working group has resolved cabling issues (placement of electronics, shielding, and isolation) related to the selected cryogenic pumps. The group is currently documenting the process control interlocks for the vacuum systems, which is expected to be complete in early April 2000. Revisions to the software requirements specification for the industrial controls FEP was completed, which incorporates a new format devised to facilitate testing and verification.

Video Distribution System: Video distribution functionality now includes the necessary equipment to provide simultaneous image capture of all input sensor and output sensor cameras. An ECR is in process that will incorporate the required cables into CSP-14 and will support the PABTS back-reflection sensors and FOA 3-omega near-field diagnostic. Additional hardware ($220K) will be needed if simultaneous image capture is also required for the FOA diagnostics.

Optics Damage Inspection: Support for a secondary Optics Inspection system was added to the rebaseline plan, including manpower to develop software to automate data collection and analysis of ultrasonic transducer signals or video images. Significant effort is also planned to develop signal-processing and image-processing algorithms. Further refinement of the plan will be necessary when several candidate systems are down-selected.

System Engineering: Extensive revision of all software requirement specifications to incorporate the latest customer and design information continues. Draft revisions were completed and are under internal review for the following FEPs: high-resolution imaging, video, wavefront control, alignment control, Pockels cell, and industrial controls. The timing, energy diagnostic, and master oscillator FEPs are being revised. The requirement definition and level of detail in these documents is greatly improved and will facilitate code development, interface control, customer buy-in, and the preparation of software test procedures.

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PROBLEMS / IMPACTS / CORRECTIVE ACTIONS

Staffing for the development of optics damage inspection image-processing algorithms remains a problem. The optics inspection lab is now producing images that require analysis; further experimentation depends on understanding the data. Support engineers will be hired in March 2000.

PROCUREMENTS

Timing system: Timing Solutions Corporation shipped the master timing generator and measurement system February 29, 2000, after successfully passing factory acceptance tests.

The first of four delay generator production contracts is expected to be placed with Highland Technology in March 2000. The first contract for 24 delay generators will be used initially to perform expanded system tests and then will be deployed to activate the master oscillator room and PAMMA next year.

VARIANCES

The rebaseline process has not been completed, and therefore, there are currently no variance statements for cost or schedule.

Upcoming Major Activities

– The master timing system will undergo extensive on-site acceptance testing during March and April 2000.

– Construction of enhanced software intended for FEIST-2.0 has started and is scheduled for a major release at the end of April 2000.

WBS 1.6 OPTICAL COMPONENTS

ACTIVITIES

KDP and DKDP Crystals

The plan to increase the conversion crystals from 41- to 42-cm square for improved ghost mitigation causes a reduction in projected yield of 13%. Assuming 42-cm doublers and triplers, material is on hand with a potential yield of 35 triplers, 71 doublers, and 104 switch crystals as of February 1.

Two rapid-growth KDP runs were completed at vendors, and one vendor rapid-growth run was started during the month. The two completed growth runs will yield an additional fifteen 42-cm doublers, increasing the total to 86.

Planting of seeds for conventional growth third-harmonic generation boules has continued on schedule at Cleveland Crystals, Inc. (CCI). Seventy-one percent of the conventional-growth tanks have been planted. A test crystal grown in one tank has been harvested and will be fabricated into samples for damage testing.

Optical Design

Review and revision of all of the optics drawings for the PAM and PABTS were completed in February, in preparation for procurements planned for March and April. The PABTS design was reviewed to ensure it was ready for procurement of the PABTS telescopes.

The Final Optics design has been reworked to increase maintainability and improve ghost mitigation. The design change required rotation by 90° of all flat fused silica optics in the FOA. This new configuration will be completely modeled in March. Documentation was completed describing the methodology, rules, and results of the replacement of the transport mirrors to accommodate the wedged lens design of the FOA.

Optical Pulse Generation and Injection System Optics

An award was made for the initial two units of the TSF Upper Injection System. Several current design changes are being incorporated into the requirements at the initiation of this work.

An activity to test production readiness has been defined and was initiated in February. This includes understanding the specifications, demonstrating the ability of the small optics suppliers to meet the specifications, and the ability of LLNL and the small optics suppliers to test the optics to verify that the specifications are met. This also

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includes demonstrating the ability to store, analyze, and transmit the data required for NIF procurement, activation, and operations.

PROBLEMS / IMPACTS / CORRECTIVE ACTION

Completion of the new FOA design has been delayed about six weeks due to the change in window orientation.

The problem identified last month regarding the incorrect placement of the injection window has been resolved with no cost impact by modestly revising the optical design.

PROCUREMENTS

No major procurements were made in February.

VARIANCES

The rebaseline process has not been completed, and therefore, there are currently no variance statements for FY00 cost or schedule.

UPCOMING MAJOR ACTIVITIES

– In March, the new mirror placement for the SY/Target Area will be put under configuration management.

– In April, the redesigned 1ω diagnostics system is expected to be complete.

WBS 1.7 LASER CONTROL

ACTIVITIES

Release of design drawings under CM continues to be a concern (see Problems/Impacts/Corrective Actions). Design work is heavy in the following areas: precision diagnostics system (PDS), RMDA, towers, tower test stand, relay optics, and lower injection system. Design work for PDS and RMDA is prioritized according to the CSP-19 schedule. Design work for the towers and tower test stand is important because of a design validation activity.

The implementation of the FSD structure as part of the NIF rebaseline planning effort continued in February. Initial reviews of the plans uncovered some missing items; these are being proposed as additions through the change control process. The planning effort continues to engage a large fraction of key individuals' time. The plans are improving in terms of scope (e.g., milestones), schedule, and cost.

Alignment Systems

The tower cart (for loading and unloading towers from the tower test stand) has been fully assembled and mounted. The preliminary test results are encouraging. A fully loaded cart will be evaluated after the safety note is written and approved.

Initial performance testing of the tower platform pinhole wheel, splitter cube, and 1ω fiber launch hardware was completed. (This initial testing used motors that had not been "baked-out" to prevent out-gassing.) Cable, rack, and space requirements to support platform testing in the OAB were determined. These items are planned to be installed in the first quarter 2001.

Engineering and design drawing work concentrated on the following items: top-level assembly drawing for the TSF alignment and CSF platforms, vacuum window holder for the relay optics, alignment cube assembly, relay optics enclosures, beam tube assembly for the lower injection system, and panel door assembly and details for the lower injection system.

Version 1.5 of the FEIST alignment controls FEP was released. Additionally, initial testing of a new alignment device to support the PAM (i.e., a rezeroing motor) began.

Beam Diagnostics

All PDS design resources are directed toward creating and completing installation drawings needed for CSP-19. The number of new drawings placed under CM is low because effort is directed to the more complex and earlier-needed installation drawings. As drawings are

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being completed, however, they are not being released into CM because the standards for checking these drawings are being revised; thus, the metric for drawing completion is not indicating actual progress and work in place.

The PDS design team needs the final optical and mechanical configuration resulting from the change to a wedged lens in the integrated optics module (IOM); the PM7 design changes and the IOM test stand design cannot proceed without this information. As an interim measure, the installation drawings submitted for CSP-19 will not show these design changes.

Documentation of RMDA continued, and a review of the system requirements is under way. Good progress is being made on development of system error budgets. Engineering staffing shortfalls were resolved in January and February.

LLNL engineers continued to work with Parsons on the routing of UV fiber from the FOA into the mezzanine and racks.

Wavefront Control Systems

The flashlamp exposure test on deformable mirror cup-to-post epoxy joints was repeated at slightly higher fluence. No creep was observed. An analysis based on recently generated scaling laws shows that the deformable mirror does not contribute significantly to the aerosols within the laser cavity; as a result of this analysis, only a low-level activity will be pursued to evaluate cleaned components in the assembly. Preliminary inspection of Xinetics actuators indicates that this first batch is of excellent quality. The first deformable mirror faceplate (pilot phase) may not have met the wavefront gradient specification; the measurements need to be repeated. Assembly of the first mirror may be delayed by a few months. (This is the time required to evaluate the coating chamber uniformity, remask it, recoat a second faceplate, and allow it to “age.”)

Problems / Impacts / Corrective Actions

Timely release of design drawings under CM continues to be an issue. A weekly review of status, staffing, and priorities is conducted within the group to insure the highest priority drawings are completed on a schedule consistent with the needs of the project. This issue continues to be worked with Engineering Services to assign designer resources commensurate with project priorities.

Procurements

A contract was awarded for fabrication of two (2) first-article injection telescopes.

The OMS motor controllers are being delivered on schedule (200 units per month, 872/1072 delivered to date). Production of the DAWN VME crates has just started (12/106 units delivered); this crate order is on schedule.

All procurements for pilot phase deformable mirrors have been placed.

Vavilov Institute (Russian fiber, B503973) submitted their proposal for a revised production schedule to provide additional fiber. Their proposal is being reviewed.

VARIANCES

The rebaseline process has not been completed, and therefore, there are currently no variance statements for FY00 cost or schedule.

UPCOMING MAJOR ACTIVITIES

- Continue cost estimating, detail budget planning, development of CAPs, and overall project rebaseline planning.
- Complete the parts of PDS and RMDA designs needed for the 100% CSP-19 Review, currently scheduled for April.
- Support testing associated with FEIST, which will involve using the prototype input sensor.
- Begin preparing procurement packages for tower structures and TSF alignment and CSF platforms.
- Continue installation of equipment and cables for the tower test stand.
- Continued fabrication of large-motor control chassis hardware and associated testing chassis.

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WBS 1.8 TARGET EXPERIMENTAL SYSTEM

ACTIVITIES

Target Chamber

The target chamber Gunite has been completed. The 16-inch concrete shell awaits painting. Painting was delayed due to environmental conditions in the Target Building.

The post-Gunite leak-up-rate test to verify the vacuum integrity of the chamber has been completed. The rate of rise is the same as before Guniting, indicating that no leak was formed during the Gunite process.

Meetings were held with PDM on the jacking and alignment system. A subcontractor will be used to supply the hydraulic jacks and to consult on their use. A trial run exercising the jacking system is anticipated in March.

The remaining items on the chamber contract are the final mapping, alignment, and spacer shims. Discussions are in progress with PDM to plan the completion of the target chamber. The remaining four months would be delayed until November of this year to allow the building to have settled into its final position and achieve thermal stability. This will produce higher alignment and mapping accuracy. Such a delay will not impact the final completion of the Target Bay.

Target Area Structures

Target Area GFE Components: Optical beam path coordinates for the LM6, LM7, and LM8 mirrors have been reviewed and are now in the Pro-E models that all design groups can use. Excellent progress is being made on the redesign of the Target Area mirror frames. The design group has been working with procurement to evaluate procurement plans that could expedite the fabrication schedule. Approximately 25% of the frames could be ready for bidders in April. This accelerated schedule could possibly save five months on the installation schedule.

Additional design help is still being sought from within the program and the Laboratory.

Target Area Beampath and Utilities: Parsons structural designers continue to prepare support structures for the beam tubes and beam tube inserts that line the concrete holes between the SY and the Target Bay.

Target Chamber Service System (TCSS): The RFQ package for the Utility Lift portion of the TCSS was issued to six companies in Janu-

ary. Amendment Number 1 to the proposal was issued February 2, and two letters answering bidder's questions were issued in February. Bids are due to be received on March 1, 2000.

The 100% design review package was issued by PaR Systems, Inc., (the Boom Lift vendor) in February. The NIF technical representative and procurement representative visited PaR to review this package in late February. The package has been distributed for discipline review at LLNL during March.

Target Area Handling: Work has begun on a simplified model of the upper mirror room that will be used to study the removal and installation of the LM6, 7, and 8 mirror packages from the mirror frames in the Target Area. The most difficult access packages are being looked at first in the hope of finding a common handling fixture for all package removals. Criteria for the removal and installation of these packages are being gathered as the package sizes and locations are established as part of the beam rotation redesign.

Work is continuing with Parsons on updating requirements for several systems within the Target Area. This month, updated requirements have been given on the Level 29'-6" access door, the Plenum Plug design, and the Rotunda hoist system. A meeting was conducted on the conceptual design for the Plenum plug, and comments are being incorporated. Criteria for the Davit cranes, monorail, and Level 40' hoist system are being reviewed prior to transmittal to Parsons.

Final Optics Assemblies

Final Optics System: The beam rotation problem has been basically solved, and the design upgrade is being implemented for all 200 beams (192 plus the two precision diagnostic arms). The reintroduction of the wedged lens helped to minimize the design changes. We are now strongly focused on implementing the design in two first articles of the beam transport frame. This implementation will enable evaluation of the as-built alignment benchmarks as well as realistic assessment of hardware and utility installation.

Progress continues to be made on the design of the FOA and on optics damage reduction. To further reduce the risk of optics damage, a design change was made to increase the physical size of the frequency conversion crystals by 1 cm to 42 cm. This increase improves shielding of scattered light through elimination of the spectralon diffuse reflector and substitution with absorbing glass. The absorbing glass removes the scattered light rather than just redirecting it elsewhere. The larger-sized crystals allow the light to be refracted to the absorbing glass without hitting metal supports. With the recent progress in

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high-quality, large-size, rapid-growth KDP, obtaining the needed larger crystal plates should be no problem, and the cost change to the system will be minor. The improvement in reduced scattering will be significant and important.

We have also completed an initial evaluation of the concept of using an inexpensive disposable debris shield in front of the main debris shield/beam sampling grating to absorb most of the effects of debris. Consumption of debris shields will be a major cost center for NIF operations. There are a number of good candidate materials including a borosilicate glass used widely in flat panel displays. In the concept, a very thin, inexpensive, disposable debris shield could be used to absorb the major debris and could be exchanged on every shot. We are designing a cassette, which ideally holds 5 to 20 shields and provides for rapid change out. The major issue for full deployment is the transmitted wavefront of the shield. The present wavefront quality would allow for use on many, but not all, of the mission shots. We are beginning work with manufacturers to define how improved wavefront could be achieved.

Progress continues on the first-article vacuum isolation valve and calorimeter chamber. We have implemented the initial ECRs against these pieces of hardware. The ECR for the calorimeter chamber was implemented to shorten the chamber to provide more room for the disposable debris shield assembly. There have been no other required changes. The work on the calorimeter chamber is progressing without any scheduling difficulties. The ECR for the vacuum isolation valve was initiated to address problems identified during the first-article testing. The vendor has implemented these changes and is trying to resume the first-article tests. Unfortunately more problems have been identified. We are working with the vendor to develop solutions and are considering our options for maintaining the scheduled deliveries of the production hardware.

Bulk damage testing at 355 nm of tripler plates cut from small rapid-growth boules demonstrated that rapid-growth material can exceed the specifications for operation at 8 J/cm^2. Material is now being grown in large tanks to test scaleup. Also, the 1.5-fold difference between the bulk damage threshold for DKDP plates cut parallel to the bottom of the boule and at the tripler orientation was confirmed for conventional-growth material. This result completes the data needed to explain why minor but non-zero bulk damage was observed for triplers operated on Beamlet at 8 J/cm^2.

Surface dehydration of KDP crystals has been measured by both FT-IR and XPS surface analytical techniques on crystals held for one to four weeks at 160°C. This reinforces empirical evidence that the thermal annealing of crystals can retard or eliminate etch pits on sol-coated crystals. The process will be used to guide development of a robust thermal anneal process for switch crystals. It is also consistent with earlier calculations using chemical kinetics derived from thermal decomposition of fine powders.

Balance of WBS 1.8

The first-wall panel model assembly is being verified, and any discrepancies or overlaps are being fixed. The first-wall drawings are complete except for the overall assembly drawing and the installation fixture. Work was done with the TCSS personnel concerning the access port interface. First-wall protection for the access port as well as protection for the plenum cover was designed.

The first target positioner boom passed its free-free vibration test but failed its static deflection test at the vendor, R^3/COI. The reason for the failure is not yet clear. LLNL personnel are cooperating with R^3/COI to isolate the problem(s) and correct them. Earliest data could be interpreted to indicate excessive bending at a change in section; a later test indicated that was not the case—instead, there was excessive bending between the cantilever support rings. Further tests are being conducted to determine how much of this might be due to local tilting at the support location and how it transfers to the total tip displacement. Any such displacement, as well as any due to local displacement of the supports, can legitimately be discounted. R^3/COI is dedicated to making this right.

The floor plan for the space where the Diagnostic Instrument Manipulator (DIM) and the target positioner will be assembled was completed, and work began setting up the room.

The test set-up for the DIM prototype was decided upon, and the hardware was installed. A reticle was placed on the end of the DIM diagnostic, and the reticle is imaged using a microscope and charge-coupled device. This image was calibrated so that repeatability of the prototype could be measured. The mechanical detail drawings for the DIM are nearly complete. The electrical design is coming along well, and detail drawings are being made. The switch locations and operating logic were decided upon. The mechanical drawings were modified to include the switch locations and cams for operating the switches. Work was done with the electrical controls group to finalize the motor selection and operation sequences. Work was also done on the DIM

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vacuum system, and a second vacuum port was added to accommodate a cryopump desired at a later date.

In the classified control room the raised floor, sprinklers, air handlers, and ceiling T rails with overhead lights have been installed, and the room is painted. The home run conduits and cable pull that were installed in this room near the ceiling have not been sprayed with fire proofing as agreed for security. This has been deferred to CSP-14 when the laser bay utility pipes will be installed through the classified control room.

The integration effort continued through the month. Engineering support is being provided to the architectural firm to work out issues with the present and future construction packages. Issues with the design of cable trays and conduits have been resolved, which solves the past months issues with clearance problems and egress routes.

A new draft defining the design of a NIF diagnostic controller has been issued and reviewed.

Problems / Impacts / Corrective Actions

Beam rotation issues continue to impact schedule and design completion costs. A baseline plan change covering the cost for completion of the beam tube and structures redesign is expected to be presented in early March. Retention of the knowledgeable ProSource designers, who have been relocated off-site, may be a potential problem in the future. The Target Area Structure and Enclosures group continues to be four designers below the level needed to complete the redesign by August as planned. Efforts to increase the design staff are being worked with program Engineering Services.

As previously mentioned, we are still having problems with the first-article testing of the vacuum isolation valve. The detailed impact is unknown at this time, but we are evaluating options for maintaining the delivery schedule for the production items. We do not believe that the problems we are having will adversely affect the project schedule.

The egress problem from the diagnostic mezzanines at the 7-ft 10-in. level has a solution that has very little impact to the project. By reclassifying these spaces from mezzanines to rooms because they are closed in and isolated from the switchyards, the occupancy can be raised from three people for a mezzanine to ten people based on 100 sq. ft. per person in a room. The longest distance in the room to a 2-hour-rated horizontal exit has to be less than 100 feet. This condition can be fixed by changing the west wall of the mezzanine to a 2-hour-rated wall and adding a 2-hour wall across the vestibule from the mez-

zanine to the west switchyard wall. This new wall will enclose these vestibules and isolate them from the switchyards to create a 2-hour-rated space to exit through to the diagnostics building. The east exit with the ladder down to the switchyard steel can remain as is with no changes, and it is classified as an auxiliary exit.

The target positioner boom did not meet the static deflection specification. The vendor, R3/COI, is working to determine the cause. In the worst case event, delivery would be delayed from April to October. The target schedule can absorb this with no effect on the NIF schedule.

PROCUREMENTS

The delivery date for the target positioner boom has been delayed to April 10, 2000. Procurement requisitions for the support structures, gimbal parts, and vacuum vessels have been signed off and will be sent out March 3. Procurement actions for the tilt and roll mechanism and for a prototype of the ball screw support mechanism have been initiated.

VARIANCES

The rebaseline process has not been completed, and therefore, there are currently no variance statements for FY00 cost or schedule. As previously reported, the FY99 milestone, Award: Turning Mirror Structures, TA8410105, originally planned for May 1999, with an estimate for December 1999, will be further delayed due to the beam rotation problem. The most recent projections are for a phased award starting in April 2000.

The FOA design is being rebaselined.

The late delivery of the target positioner boom will not affect the overall schedule. The procurement of the target positioner boom was started early last year before the present NIF schedule was developed. Because of this, there is enough float in the schedule to cover this delay.

UPCOMING MAJOR ACTIVITIES

- Continue redesign of Target Building GFE Beam Tubes and Mirror Frames as required for the beam rotation solution.
- Work with Procurement for initial procurements and continue to develop means to reduce schedule impacts.
- Award TCSS Utility Lift design/fabrication contract.

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- Review vendor's (PaR) Boom Lift 100% design package and authorize start of fabrication.
- Continue work with Parsons on Target Bay beampath and handling design issues.
- Discuss UV optics damage issues at the Optics Damage Workshop.
- Evaluate and approve the FOA redesign (by the CCB).
- Continue to work for completion of Title II designs for the Target Positioner, the First Wall Panels, and the DIM and target diagnostic data acquisition system.
- Start procurement of parts for the first-article DIM.
- Finish the rebaselining activities.
- Hold the 100% design review for the DIM.
- Complete the DIM prototype testing in March.
- Continue work on the DIM electrical design.
- Finish the DIM mechanical detail and assembly drawings.
- Hold the 100% design review for the first wall in March.
- Continue the model verification for the first-wall panels.

WBS 1.9 OPERATIONS SPECIAL EQUIPMENT

ACTIVITIES

Optical Transport and Material Handling

Overall Assessment: The primary focus has been on design/drawing completion of the delivery systems and the testing of the first-article systems. The integrated tests of the bottom-loading universal delivery system had its first successful full sequence consisting of docking, cover removal, and PEPC LRU insertion. The first fabrications and hardware for the flashlamp and amplifier slab delivery systems are being procured, assembled, and tested. This includes the start of the prototype tests of cover removal systems and cover seals. The contract for the second and third transporter has been awarded.

Bottom-Loading Delivery Systems:

Universal: The spatial filter insertion system (SFIS) hardware is assembled, and final wiring is being completed. The mock LRU has been assembled to use during the test program. A test stand is in fabrication that will be delivered next month. The test stand will be used for bench testing prior to integration into the canister. The safety note for the SFIS lifting fixture is complete and in review. The lifting fixture hardware is assembled and ready for use pending the safety note.

The airflow system fabrication is under way. Delivery of the filters is complete, and the sheet metal parts are finished through plating. Delivery of the full system will be in March. Scheduling the assembly and testing of the completed airflow system is an open item.

Several successful PEPC insertion sequences have been performed. These include docking the canister with the transporter, removing the beamline cover, installing or removing the PEPC test LRU, replacing the beamline cover, and undocking the canister. A number of tests have been performed to improve the docking repeatability. This issue should come to closure next month with a decision on any required hardware modifications.

We completed a fit up of the Periscope Spacer with the Universal Canister hardware. The fit up of the Periscope hardware, including the LRU, will continue over the next couple of months, leading up to a demonstration of the full stack up of all components.

Flashlamp: Delivery of the flashlamp canister weldment is on schedule for delivery in March. The canister will be cleaned with a high-pressure spray and a non-etch cleaner. The chemical etch vendor is limited by overhead crane capacity and is excessively expensive. Other

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options are under consideration, but it appears satisfactory to use the high-pressure spray. The horizontal translation mechanisms are on schedule for a March delivery from THK. The carriage system is in fabrication with a delivery in March. The cover remover prototype testing instigated a design modification that is incorporated. Fabrication of the cover remover system should begin in March with a delivery in April or May. The top plate is in fabrication.

Amplifier Slab: Procurement began on the canister support stand. We received the cover-remover-mechanism fabricated parts, completed release of the LRU lifting carriage drawings, and continued detailed design of the upper canister assembly. Detailing of the LRU insertion mechanism also began.

Flashlamp Beamline Covers: The design for the flashlamp beamline covers is complete and validated through testing. Fabrication is under way for the first-bundle machined components. The remaining contracts are in work for exercising the option for the second-bundle machined components; the FY00 delivery of seals; the cleaning and assembly of the first two bundles; and the fabrication, cleaning, and assembly of bundles 3-24.

Amplifier Slab Beamline Covers: We placed the order for the second bundle (including spares) of slab cassette cover machined parts. Quotes were received for the production of cover seals, procurement began for cleaning and assembly of the first two bundles of covers, and procurement was started for cover production order.

Controls: A new operating system was installed in the side- and top-loading canister FEPs. The new terminal server operating system will simplify human interface development. The amplifier slab bottom-loading canister FEP has been fully configured and tested with all I/O cards. Wireless network hardware for all canisters has been defined. Significant progress has been made on controls software in the area of sequencing and human interface development. Good progress has also been made on canister documentation.

Top-Loading (TL) Delivery Systems

The delivery of vacuum covers continues (33 out of 72 received). Twelve covers have been delivered to infrastructure for cleaning and installation. Refurbishment of the TL canister continued, seismic restraints were added to the LRU carriage, rod ends were replaced on the LRU carriage and cover translation mechanism, and springs were replaced on the pressure relief panel. Completion of assembly drawings is on hold.

Side-Loading (SL) Delivery Systems

We changed the control box mounting angle to accommodate the increased length of the PAM LRU and began procurement of the SL tug hitch and counterweights. Completion of assembly drawings is on hold.

Switchyard and Target Area Delivery Systems

The SY1 and SY2, CSP-19, monorail system and vertical rail infrastructure drawings are complete, checked, and will be updated in March. These drawings will be released by March 31, 2000. The monorail hoist system design has been reviewed, and potential cost reductions are planned. These cost reduction changes will be included in the CSP-19 specification. The remainder of the SY/Target Building activity is on hold.

Laser Bay Transporter

The contract for the procurement of transporters #2 and #3 has been awarded. The contract was awarded to AGV Products, Inc. located in Charlotte, NC. This is the same company that designed and built the first-article transporter. Initial discussions with the vendor indicate a lead-time of approximately 8–9 months. This will put the delivery of the transporters to LLNL sometime in November. We will meet with the vendor next month to try to improve the delivery time and will receive the transporter project schedule. New features that will improve the transporter battery usage, increase hardware accessibility for maintenance, and enhance the transporter safety systems will be incorporated into the new transporters. The new transporters are necessary to start the delivery systems testing with the OAB systems.

OAB Special Equipment

The acceptance tests for the large gross cleaner and small mechanical parts gross and precision cleaner were completed at the equipment supplier in late February. We continued preparation for equipment start-up for the large mechanical parts precision cleaner.

A purchase request for all OAB amplifier assembly stands was placed, the conceptual framework for transport and handling of flashlamp LRUs in the OAB was developed, and a finite-element analysis of OAB docking port components was completed.

An OAB Transport and Handling Equipment Review was presented on February 18, 2000. The review generated a number of action items that will be addressed in follow-up meetings.

The Aluma-lift is about 60% complete with machining piece parts for the first LRU transporter. Assembly is expected to start in mid-April.

LRU Verification Equipment: The technical lead for the LRU Wavefront Verification System (WAVES) started work on the project in February. He will be responsible for all phases of the project including

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revalidation of the system requirements, design and engineering of the system, procurement, installation and activation. A revised schedule and budget for this effort has been included in the project's rebaselining plan. This month several options were evaluated for the location of WAVES. Most likely the system will be located in the Optics Transfer Area of the OAB.

OAB Controls: The New Optic Insertion Device (NOID) design reviews are complete and include input from all end users. Detailed design documentation, procurements, and fabrications are now in progress.

OAB Web Site: An OAB information site is under development and the first version available at https://nif-is.llnl.gov/oab/

OAB Facility: Status Report, Phase #1, "Conditional Acceptance" of the OAB was signed on 2/25/00, and the OAB contractor (CSP-5) training is complete. The OAB co-occupancy phase continues to work well, with activities occurring simultaneously by the CSP-5 contractor and the LLNL personnel working on programmatic activities. Construction for CSP-17 has been awarded to Scott Mechanical. The Notice to Proceed will occur early in March. Completion of the OAB Phase 2 (Project Closeout) is planned to occur by mid-March, and Completion of Phase 3 (Final Acceptance) by the end of March.

PROBLEMS, IMPACTS, AND CORRECTIVE ACTIONS

The delivery of the additional Laser Bay Transporters has slipped from this summer to the fall. This was due in part to the long procurement process and the fabrication schedule of the transporter frame weldments. This will impact the testing with the OAB. Discussions with the OAB group and the transporter vendor will begin to try to reduce this schedule impact.

PROCUREMENTS

None.

VARIANCES

The rebaseline process has not been completed, and therefore, there are currently no variance statements for FY00 cost or schedule.

UPCOMING MAJOR ACTIVITIES

– New "crabbing" motors will be installed in the first-article transporter in April.

- The universal bottom-loading canister will be used for docking, cover removal, PEPC installation/removal activities, and Spatial Filter installation/removal activities.
- The universal bottom-loading canister will be used to demonstrate a full stack up of all hardware required to install a Periscope LRU.
- A demonstration of a LRU insertion/removal full sequence will be performed using the Laser Bay transporter and universal bottom-loading canister.
- Assembly and testing of the flashlamp and amplifier slab delivery systems will continue as fabrications and hardware are received.

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WBS 1.10 START-UP ACTIVITIES

ACTIVITIES Scope, schedule, and budget for this area are being reviewed, and plans will be discussed in the March monthly report.

WBS 1.11 ES&H AND SUPPORTING R&D

ACTIVITIES

Assurances safety and environmental reviews of the use of ultrapure synthetic air in beam tubes and amplifier cooling have been conducted. Tests of NOX formation from flashlamp operation verified that no significant levels of NOX are generated.

Technical Support

Most equipment is in place and ready for Pilot II laser glass production at Hoya Corporation USA. The final contract is being put in place to allow start-up in April. Fine annealing studies using Pilot I glass have shown promising improvements in glass quality. Hoya produced and shipped 465 additional slab equivalents (SE) of edge cladding in February. Cladding production is expected to continue through the early part of April, when raw materials will be exhausted.

Schott Glass Technologies produced over 200 slabs in the initial phase of pilot production. The initial metrology data is promising with final results available in the March to May time frame as the slabs are fine annealed and measured for NIF specifications. Problems encountered during the campaign forced a temporary shutdown in mid-February. Repairs and modification of operating parameters are under way and are expected to be completed in time for restart by late May.

Commissariat a L'Energie Atomique (CEA) representative Daniel Taroux spent the month of February with the Laser Glass Group at LLNL primarily to work on the details of planning, coordinating, and integrating CEA-LLNL laser glass production efforts and contracts with the glass vendors. Plans will be completed in March to work out the details for cooperation and cost sharing in laser glass production through 2005.

Switch windows and target chamber vacuum windows for the NIF First Bundle were completed by Tinsley, but were rejected by LLNL. The optics failed the PSD II Waviness and roughness specifications due to changes at Tinsley. The optics are being reworked to meet these specifications, with the first optic already successfully repaired. A micro-interferometer is being added to the Tinsley NIF Manufacturing Facility to increase in-process visibility of these two critical specifications. The Lapmaster continuous polisher is now meeting the goal of producing windows with less than one wave of transmitted wavefront error and is in use for fabrication of windows. The Tinsley pilot contract was modified to allocate funds for the remainder of pilot production.

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All sixteen of the LM2 mirrors to be fabricated during Pilot have now undergone final testing at Kodak. Acceptance to full NIF specifications awaits absolute calibration of normal-incidence reflected wavefront using a “round robin” optic measured by the National Institute of Standards and Technology.

Zygo met all NIF specifications on the first three polarizers and shipped them to LLNL in February. Depending on the inhomogeneities in the glass, some polarizer blanks will require additional deterministic finishing to meet NIF transmitted wavefront specifications (done at Kodak). Zygo has also shipped amplifier slabs to Kodak where they will be small-tool figured to correct material inhomogeneities. Sufficient LM3 and LM8a mirrors have been shipped to meet first-bundle requirements. In addition, Zygo has completed all of the PDM mirrors for one switchyard.

The Laboratory for Laser Energetics (LLE) has reduced coating nonuniformity by masking to less than 1%. The coating uniformity requires further improvement to ensure optics will meet the root-mean-square gradient specification. Work continues to improve positional accuracy of the masks and of mask designs that require less positional accuracy. Spectra-Physics has debugged the new control system on their coating tank and resumed coating operations. The acceptance testing of the 18-in. interferometer at Spectra-Physics was completed successfully in February.

The blastshield meniscus coater has been successfully tested on full-sized glass panels. Characterization and optimization of the sol formulation and application speed is under way. Design of the new sample fixtures for blastshield coating qualification was completed and a prototype was built and approved. The urethane dispensing system (blastshield glass-metal seal) was assembled and tested. The appropriate size of static mixers and needles has been identified, and the system is ready to move from the plastic shop to the OPDL.

The 24-in. Wyko interferometers at LLNL, CCI, Kodak and one of the two at Tinsley have all been affected by the failure of the laser diode. It is believed that the latest batch of diodes is more sensitive to optical feedback resulting in the higher failure rate. Both the diode manufacturer and Wyko were able to verify that an optical isolator added after the laser source was able to stop the feedback and increased the coherence length. Four modified units have been ordered and are scheduled for installation on all disabled interferometers in March. Secondary efforts include locating a second source for the laser diodes and an alternate source design using a He-Ne laser. To preserve life on

remaining functional interferometers, the procedure has been modified to turn off the laser between measurements.

The second Bauer photometer was shipped to Spectra-Physics. Damage occurred in shipping that has now been corrected. Acceptance testing of the photometer is planned for March. Performance deficiencies from the first unit at LLE have been identified, and corrective action is under way.

PROBLEMS / IMPACTS / CORRECTIVE ACTIONS

The fabrication and assembly contract was awarded to Tinsley as part of the effort to complete the Lens Optical Test System (LOTS). Final metrology cannot begin on lenses until the LOTS is completed and validated. Tinsley has begun reworking windows that failed the PSD II-Waviness and roughness specifications.

As projected last month, the diodes failed on three Wyko 24-in. interferometers in February. A new diode design incorporating an optical isolator was designed through collaboration between LLNL, Wyko, and the diode supplier. The first new diodes are expected to be available in early March.

PROCUREMENTS

A contract for $240K was awarded at Tinsley for the fabrication and assembly of two Lens Optical Test Systems.

A contract modification for an incremental $461K was made at Tinsley to extend the pilot contract through FY00.

VARIANCES

The rebaseline process has not been completed, and therefore, there are currently no variance statements for FY00 cost or schedule.

UPCOMING MAJOR ACTIVITIES

– Initial quality control measurements will be available in March to verify whether the laser glass fabricated in the initial phase of Schott's pilot will meet NIF specifications.

– The contract for Pilot II melting campaign will be awarded to Hoya Corporation in late March for an April start-up at the conclusion of their edge cladding run.

– A contract to deterministically finish 20 polarizers using ion figuring at Kodak is expected to be awarded in early March.

– An RFP for commercial fabrication of the second KDP semi-finishing machine is expected to be issued in the second quarter of FY00.

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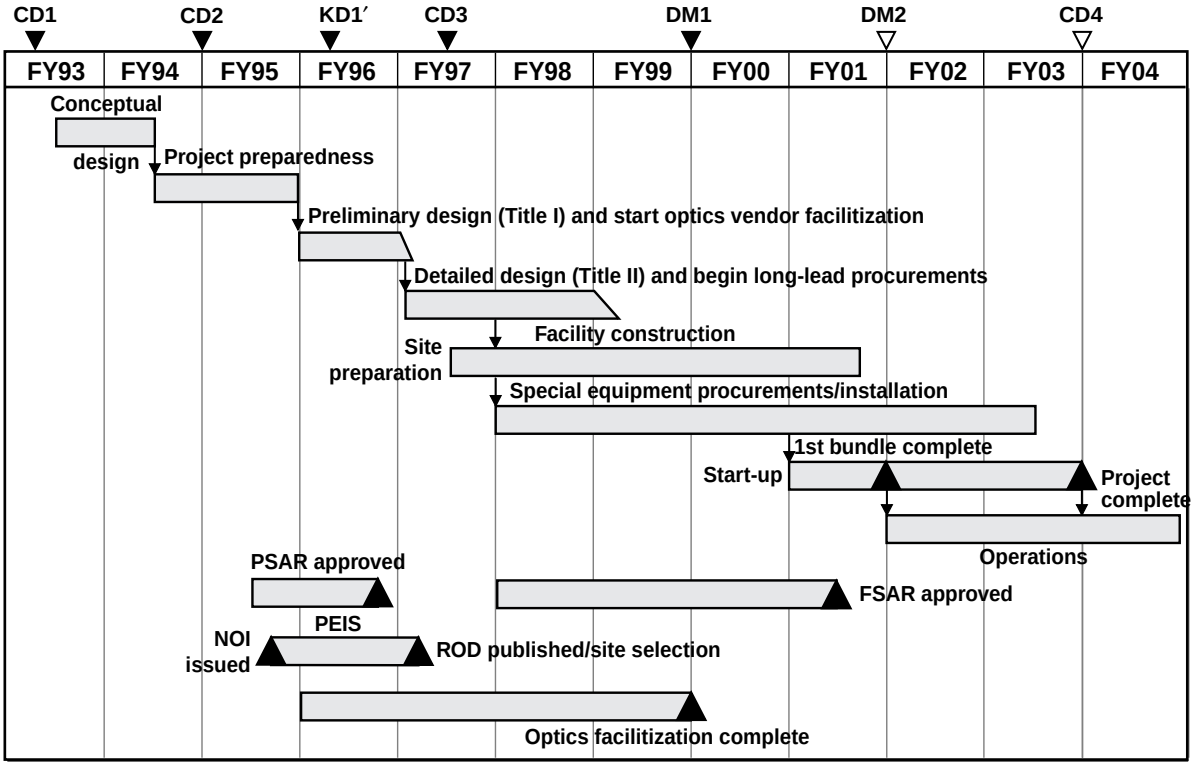
- The first finished amplifier slab meeting all NIF specifications should ship from Zygo in March and be ready for PSDII and micro-roughness validation at LLNL.
- New diodes with optical isolation will be available for the 24-in. Wyko interferometers in early March and will be installed at LLNL and all affected vendor sites.
- The results of the safety evaluation of synthetic air will be reviewed with NNSA.
- The Construction Safety Program update will be initiated: (1) new NIF organization, (2) augmented CM responsibility, and (3) initiatives for more worker involvement in hazards evaluation.

ATTACHMENT 1: SCHEDULE STATUS

The schedule status section will provide (1) a summary schedule, (2) a status of the NIF Project Execution Plan milestones, and (3) a status of the NNSA performance measurement milestones.

At this point, Project schedules are being rebaselined to implement the completion options to be selected by the NNSA. When the new schedules are prepared, they will be statused in the monthly report.

Summary Schedule



CD1 Approve mission need
CD2 Approve new start
KD1' Dellum's Process—NIF Study complete
CD3 Approve construction start
CD4 Approve Project completion
DM1 Optics Facilitization complete
DM2 End Conventional construction

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The rebaseline schedule will result in an update to the NIF Project major milestones to reflect the completion options proposed to the NNSA. Until the rebaseline schedule is available, the current baseline will be statused.

Status of NIF Project Execution Plan Milestones

Milestones	NNSA Acquisition Executive Level 0	NNSA Office of Inertial Fusion and the NIF Project Level 1	NIF NNSA Field Office Level 3	NIF Laboratory Project Office Level 3	Date Planned	Date Actual
Approval of Mission need (CD1)	X				Jan 1993	Jan 1993
CDR Complete				X	May 1994	May 1994
Approval of New Start (CD2)	X				Oct 1994	Oct 1994
Notice of Intent Issued		X			Jun 1995	Jun 1995
KD1' Dellums Process Complete	X				Dec 1995	Dec 1995
Architect/Engineer Contracted				X	Dec 1995	Dec 1995
Title I Initiated				X	Jan 1996	Jan 1996
Construction Manager Contracted				X	May 1996	May 1996
PSAR NNSA Concurrence			X		Aug 1996	Aug 1996
PSAR Approved				X	Sep 1996	Sep 1996
NEPA Record of Decision	X				Sep 1996	Dec 1996
Approval to Initiate Title II Design			X		Sep 1996	Nov 1996
Approval to Initiate Long-Lead Procurement			X		Sep 1996	Nov 1996
Approval to Initiate Construction (CD3)	X				Mar 1997	Mar 1997
Issue Pollution Prevention & Waste Minimization Plan			X		Sep 1998	Sep 1998
Optics Facilitization Complete (DM1)		X			Oct 1999	Oct 1999
Start Special Equipment Installation				X	Nov 1998	Nov 1998
Target Chamber Installed				X	Oct 2000	
LTAB Superstructure Complete				X	Dec 2000	
FSAR NNSA Concurrence			X		Feb 2001	
FSAR Approved				X	Mar 2001	
LTAB Construction Complete				X	Jul 2001	
End conventional Construction (DM2)		X			Sep 2001	
ORR/ORE Complete—Start Early Operations			X		Sep 2001	
End of Construction			X		Apr 2003	
Project Complete (CD4)	X				Oct 2003	

Status of NNSA Performance Measurement Milestones

The NNSA-approved NIF Transition Period Implementation Plan contains a set of performance milestones from October 1, 1999, to June 1, 2000. These milestones are statused by NNSA on a weekly basis. The NIF Monthly Status provides the completed milestones at the end of February 2000.

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NIF rebaseline schedule

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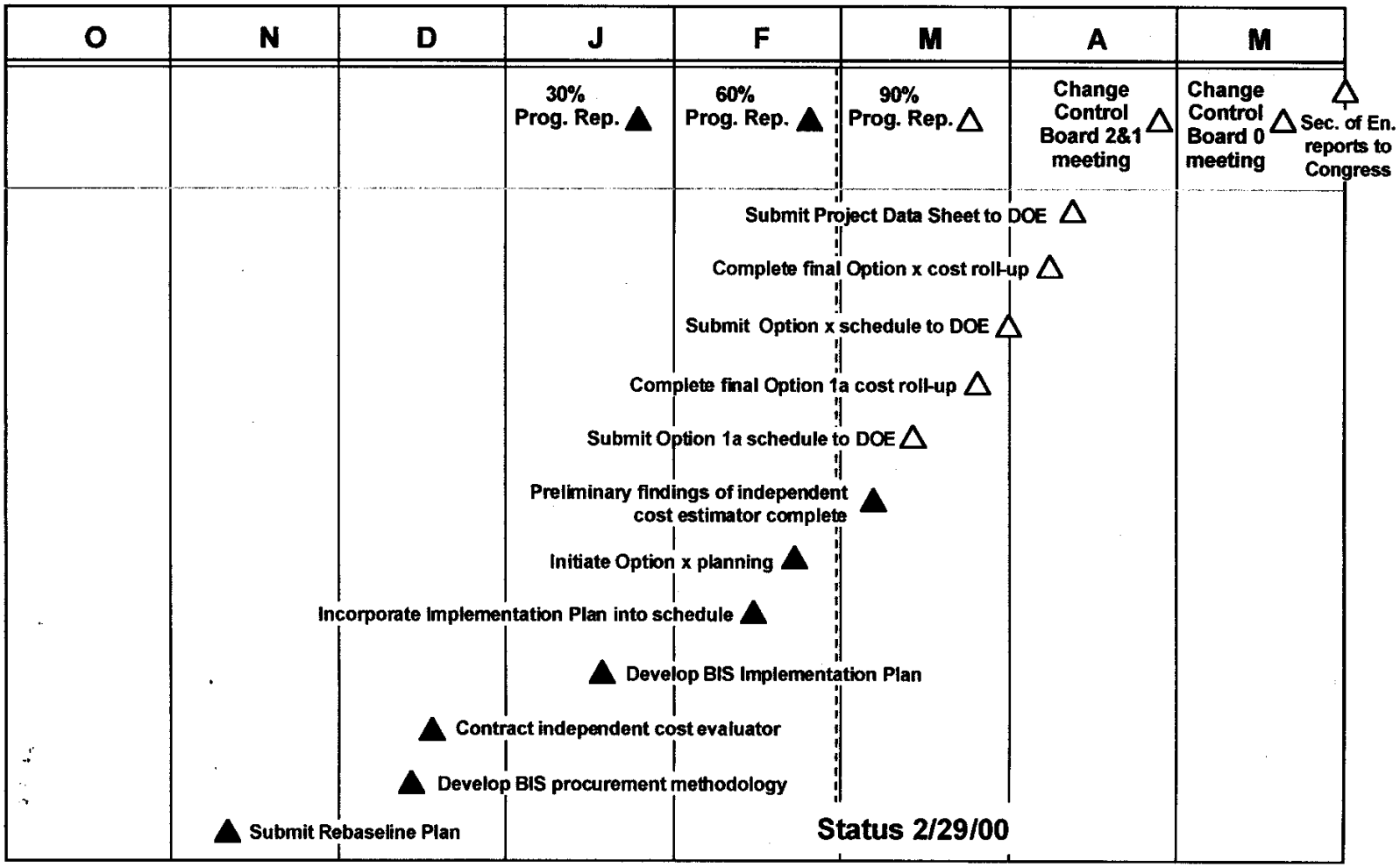

Conventional Facilities – FY00

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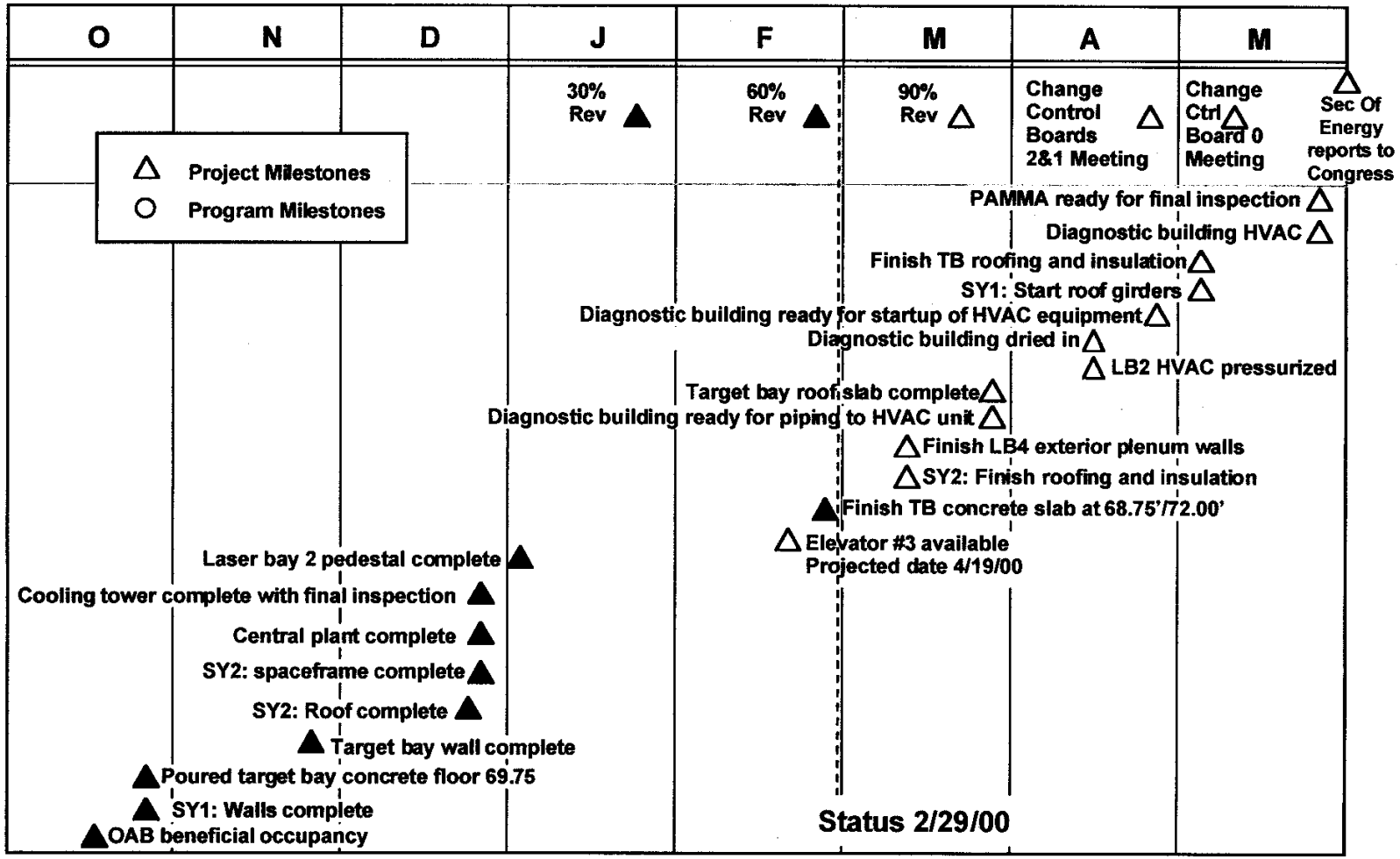

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Beampath Infrastructure — A/E and CM/GC – FY00

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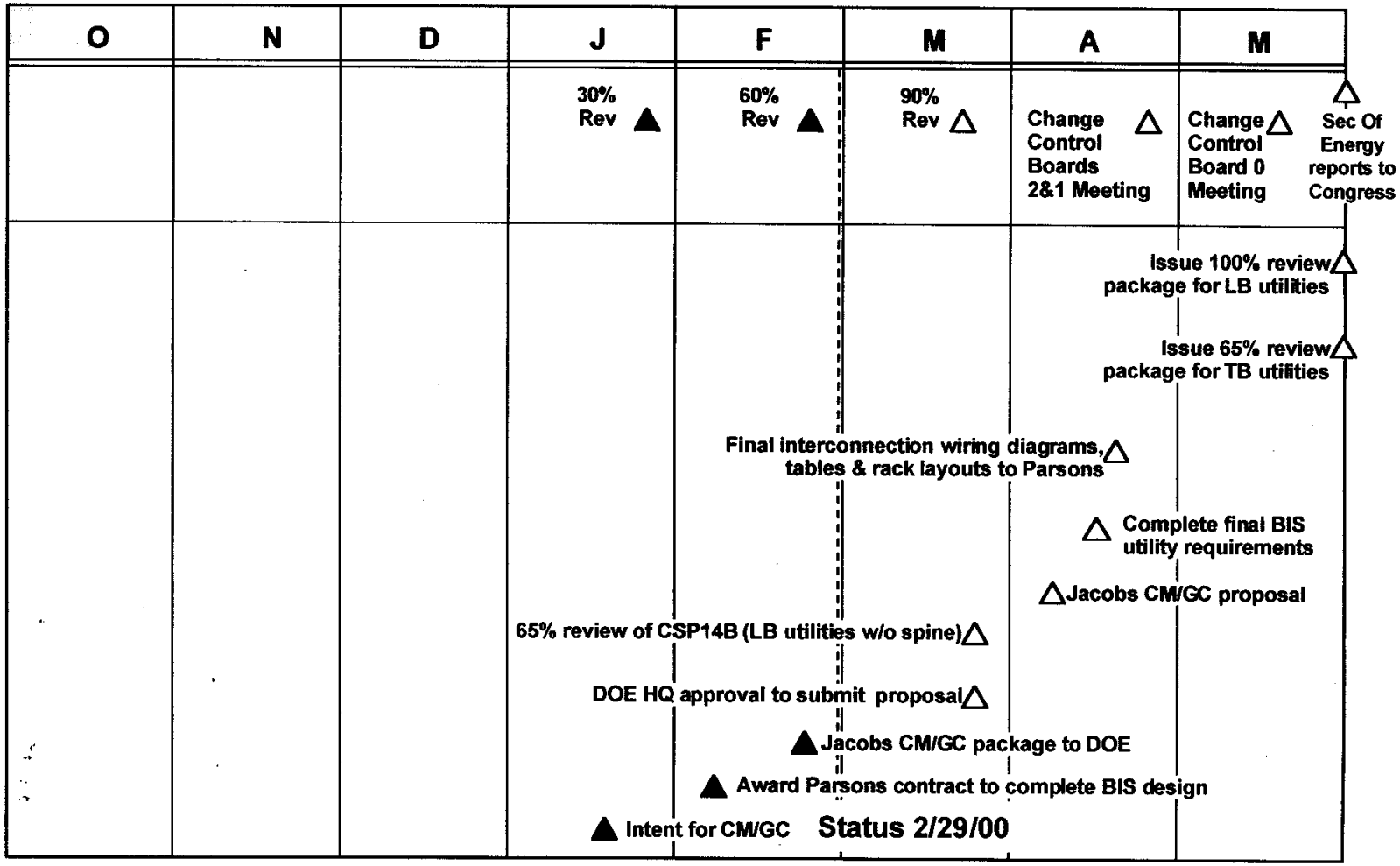

Beampath Infrastructure — construction subcontract packages – FY00

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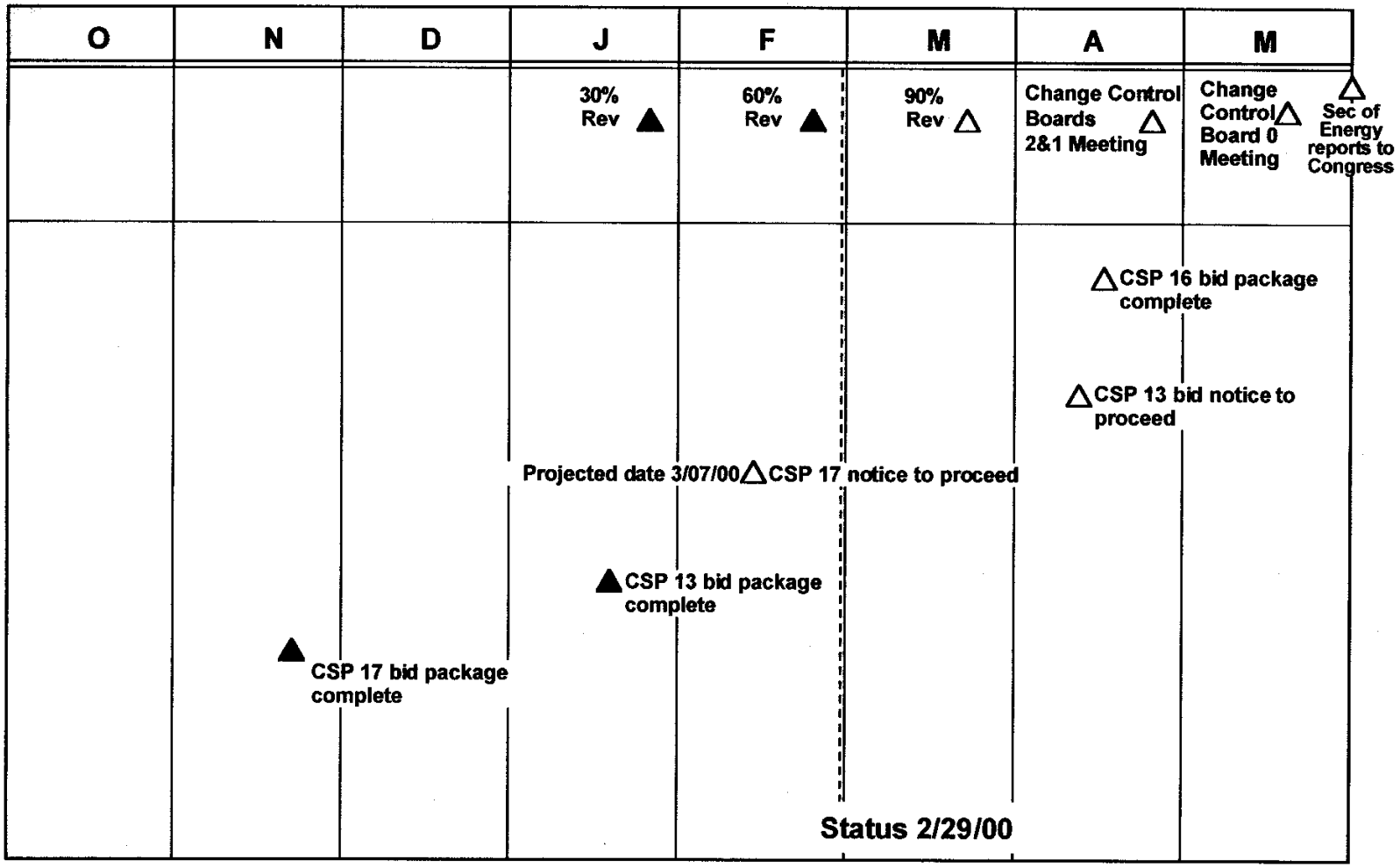

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Beampath Infrastructure — GFE – FY00

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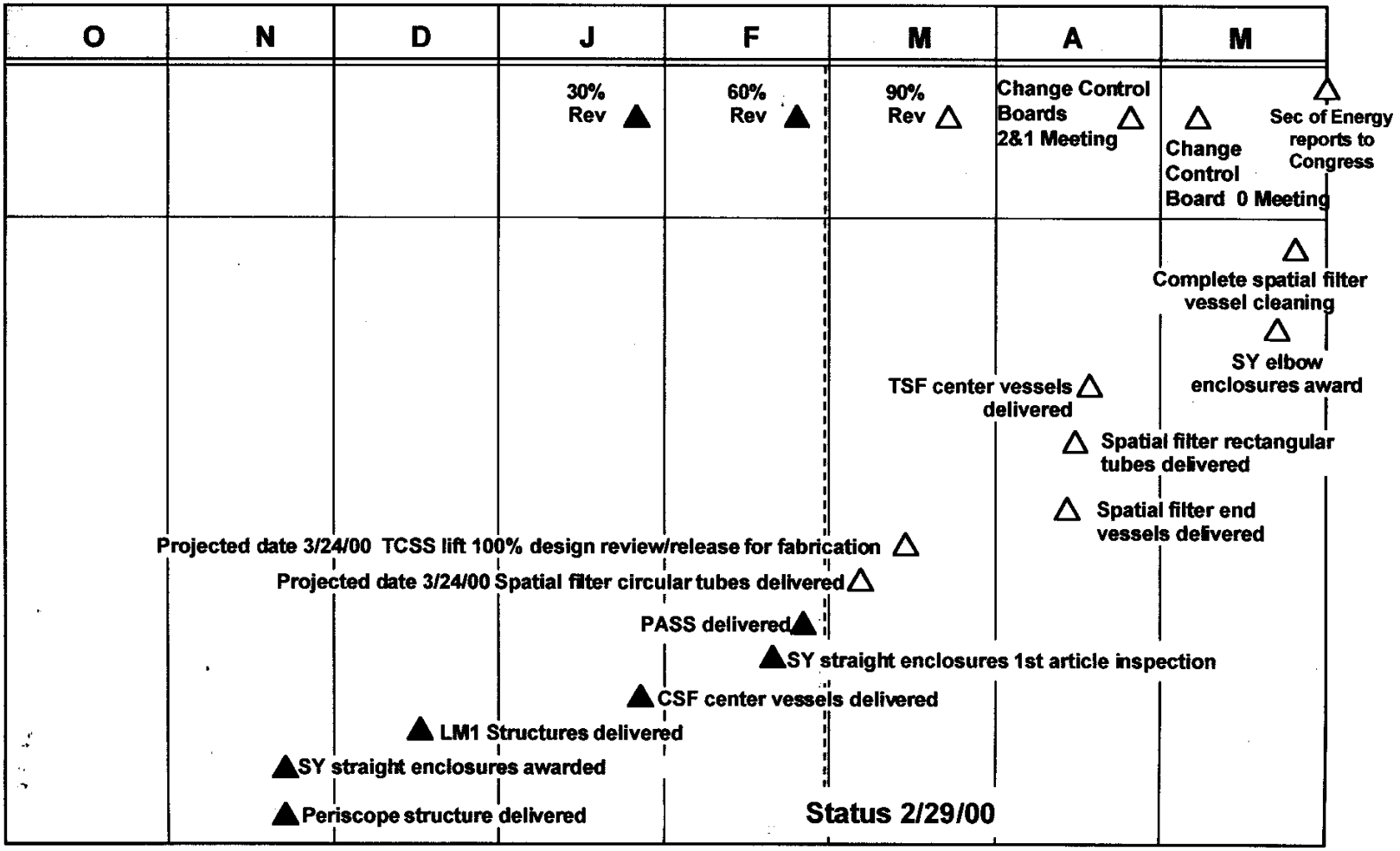

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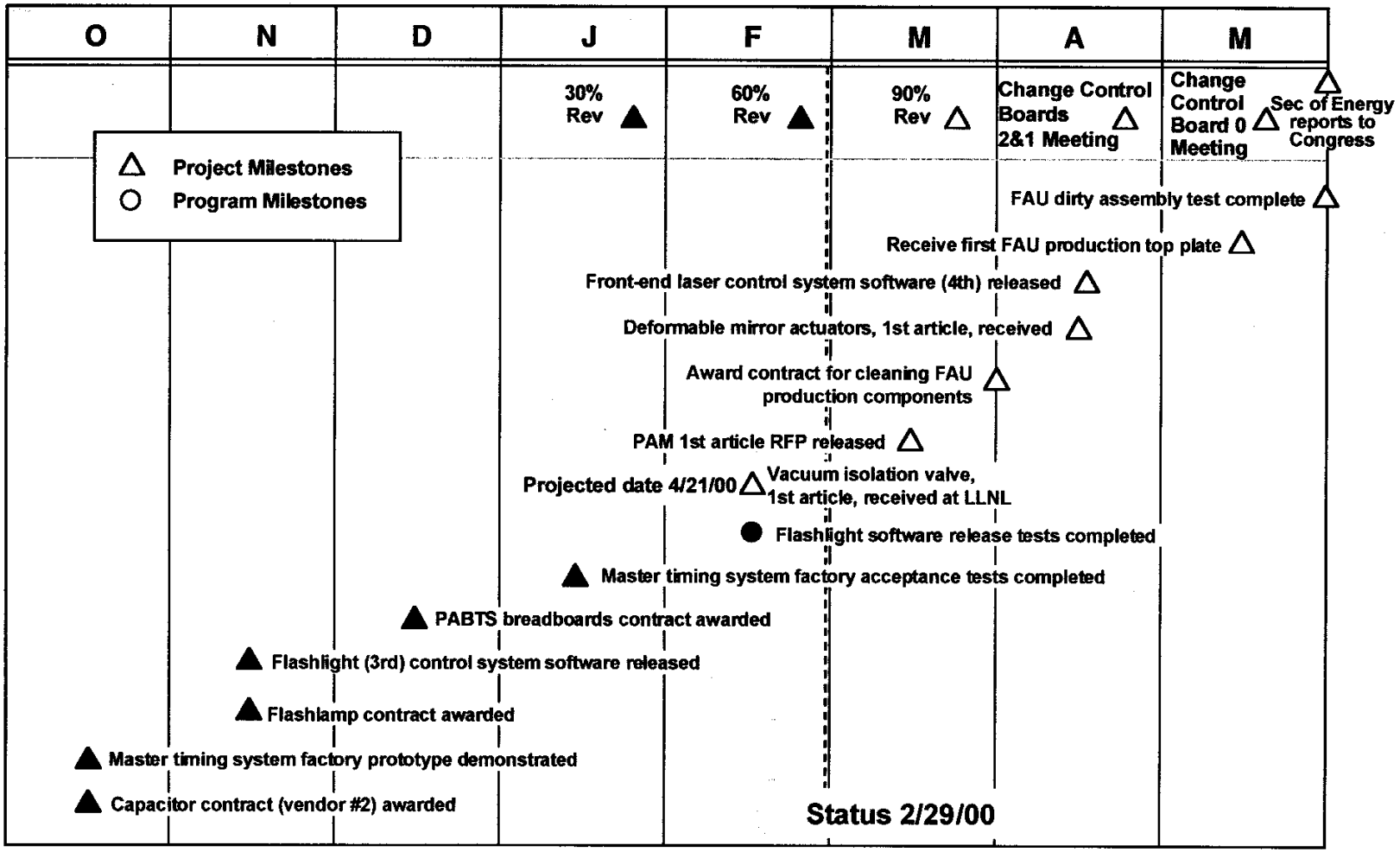
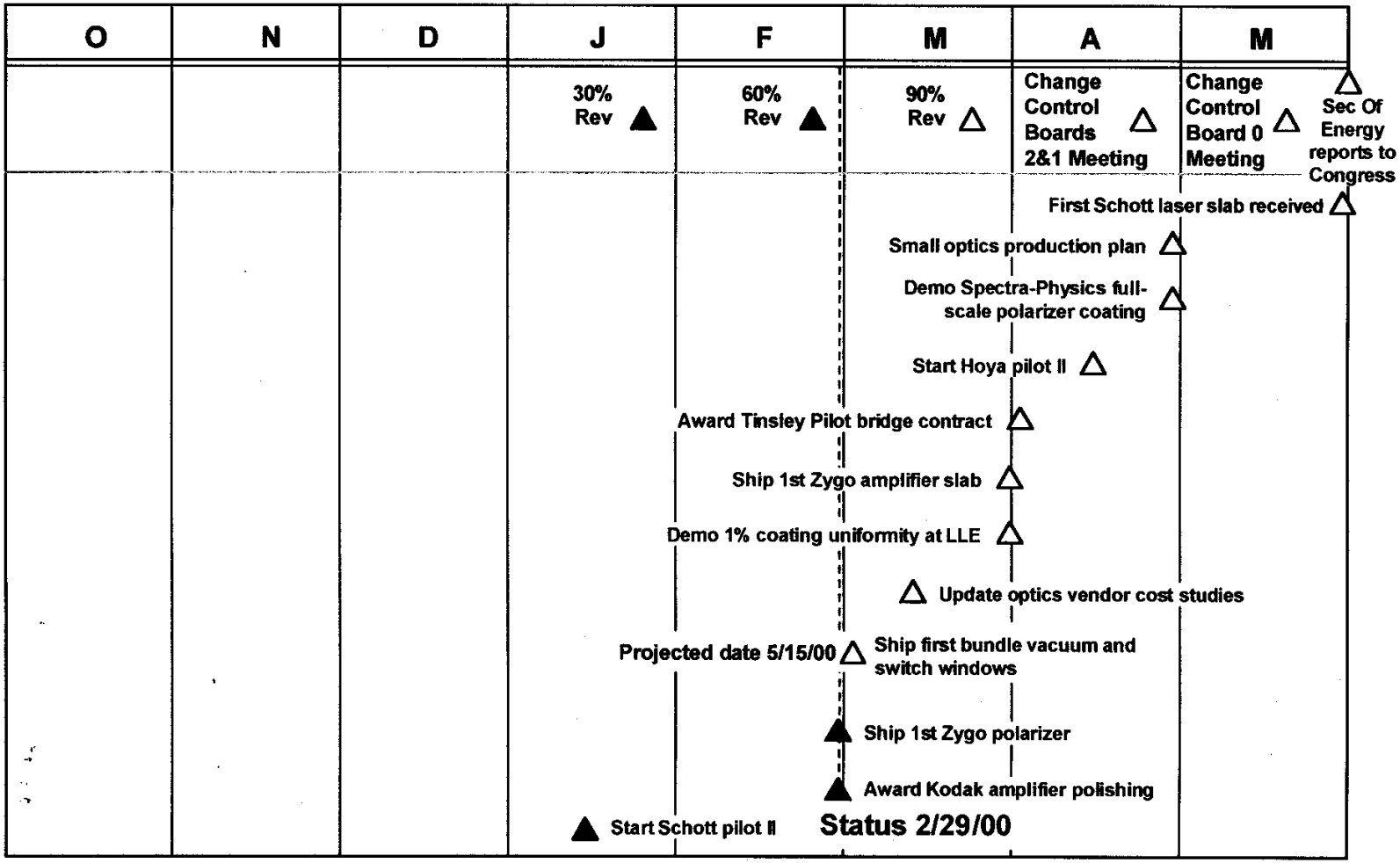
Line Replaceable Units – FY00

NIF
The National Ignition Facility



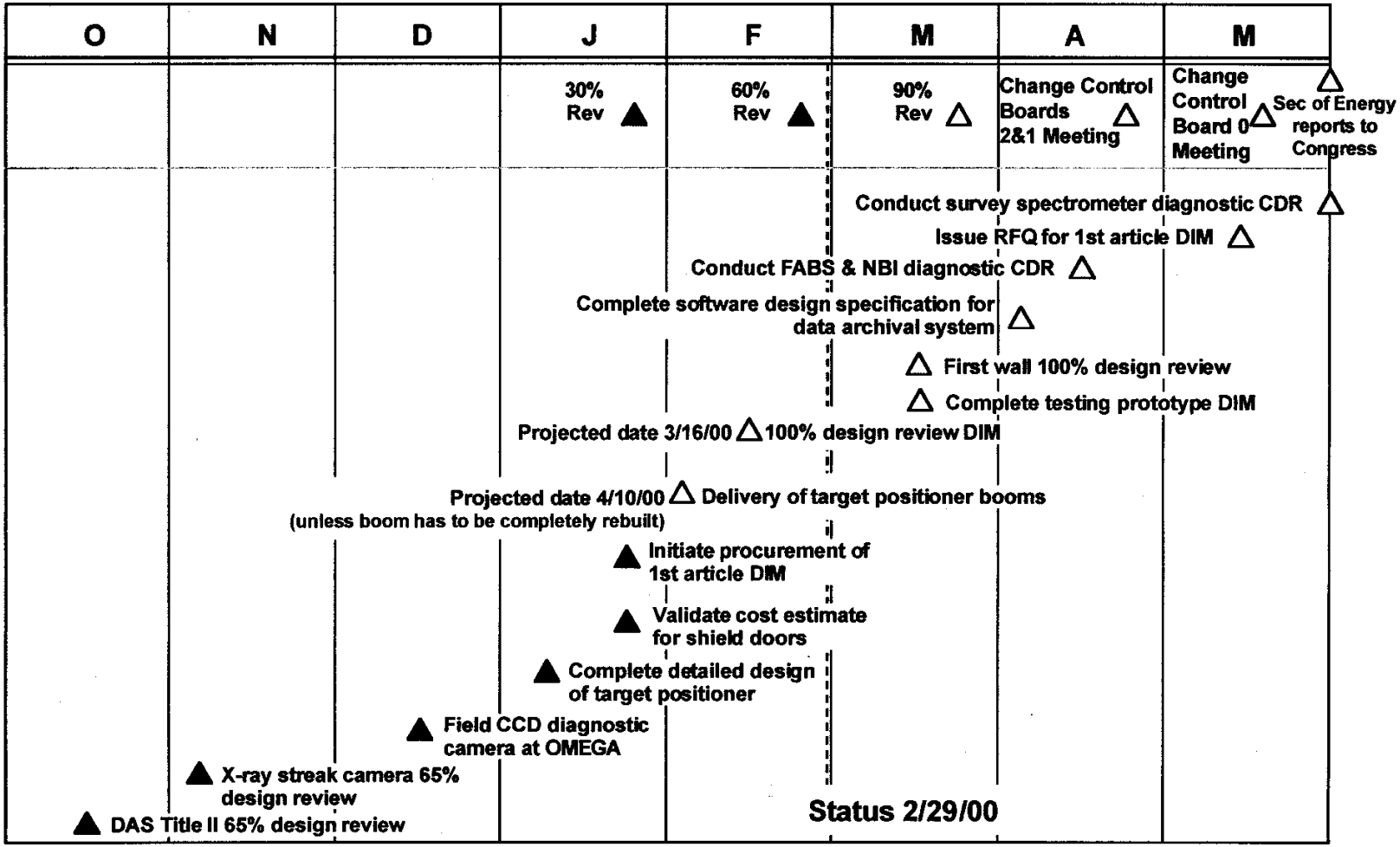
Optics – FY00

NIF
The National Ignition Facility



Target Area Systems and Target Diagnostic Systems—FY00

NIF
The National Ignition Facility

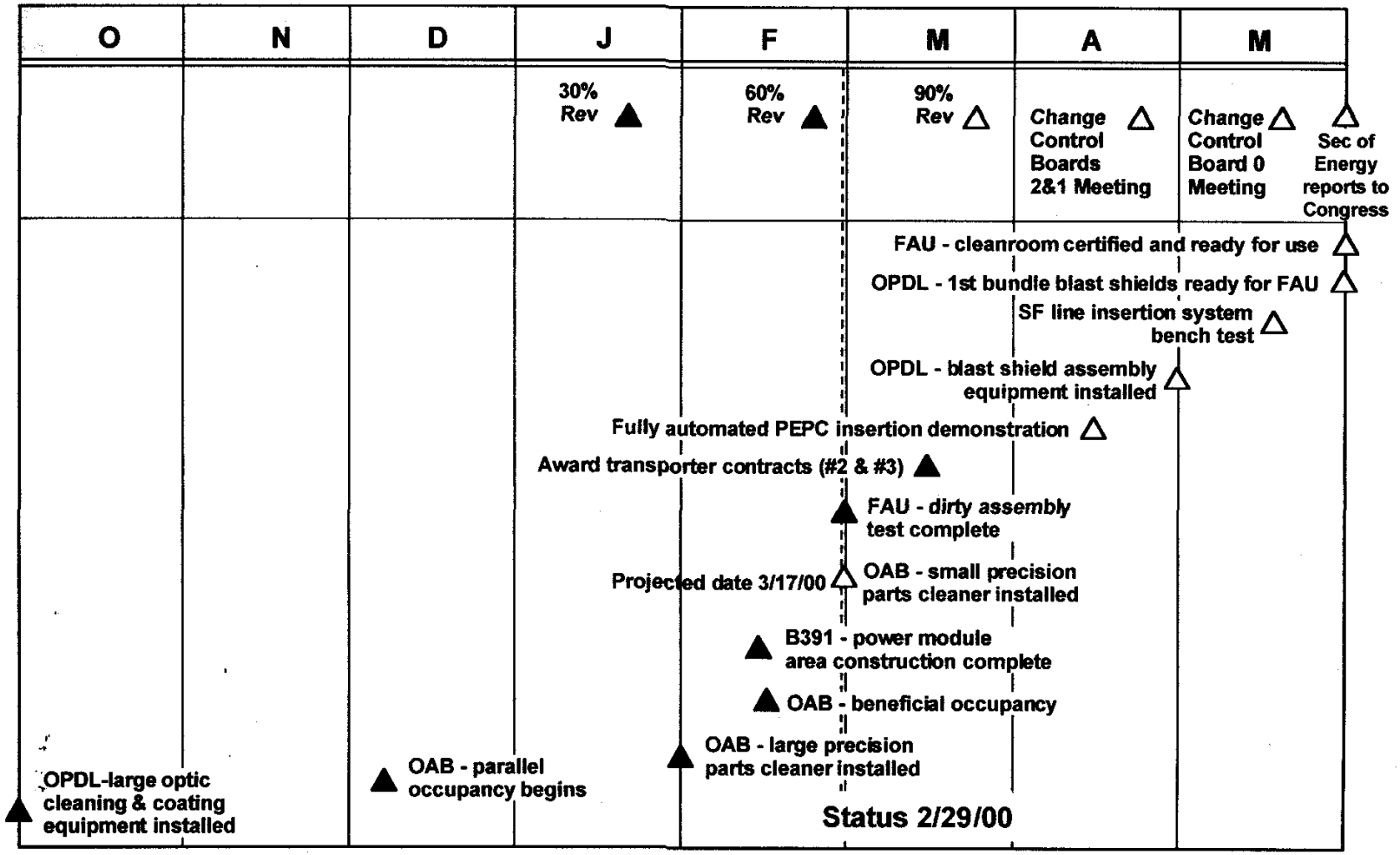


40-00-0100-0318G
25EM/ncz

2/29/00
ncz

Assembly/Refurbishment Facilities – FY00

NIF
The National Ignition Facility



40-00-0100-0155H
25EIM/ncz

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ncz

ATTACHMENT 2: FINANCIAL STATUS

The financial status includes (1) FY00 plan to actual Cost and Cost plus Commitments monthly for Total Project Cost, Total Estimated Cost, Other Project Cost, and each WBS Level 2 element; (2) the FY00 Contingency Log as of February 2000; and (3) FY00 manpower plan to actual.

PROJECT PLAN TO ACTUAL COST AND COST PLUS COMMITMENTS

FY00 NIF Cost and Cost and Commitment plans are presently shown as straight-line estimates of the current year budget allocations. In conjunction with the rebaselining effort, provisional (pending rebaseline approval) FY00 CAPs are scheduled to be completed by March.

The February 2000 WBS Level 2 variances resulting from actual versus the drafted straight-line budget plans are not individually discussed. Total Project Cost, Total Estimated Cost, and Other Project Cost and Cost and Commitment variances ranging from 4% to 40% of actual below straight-lined plans indicate that overall FY00 costs and commitments are well within the current year funds availability. This conservatism is expected to prevail as long as rebaselining efforts are in progress.

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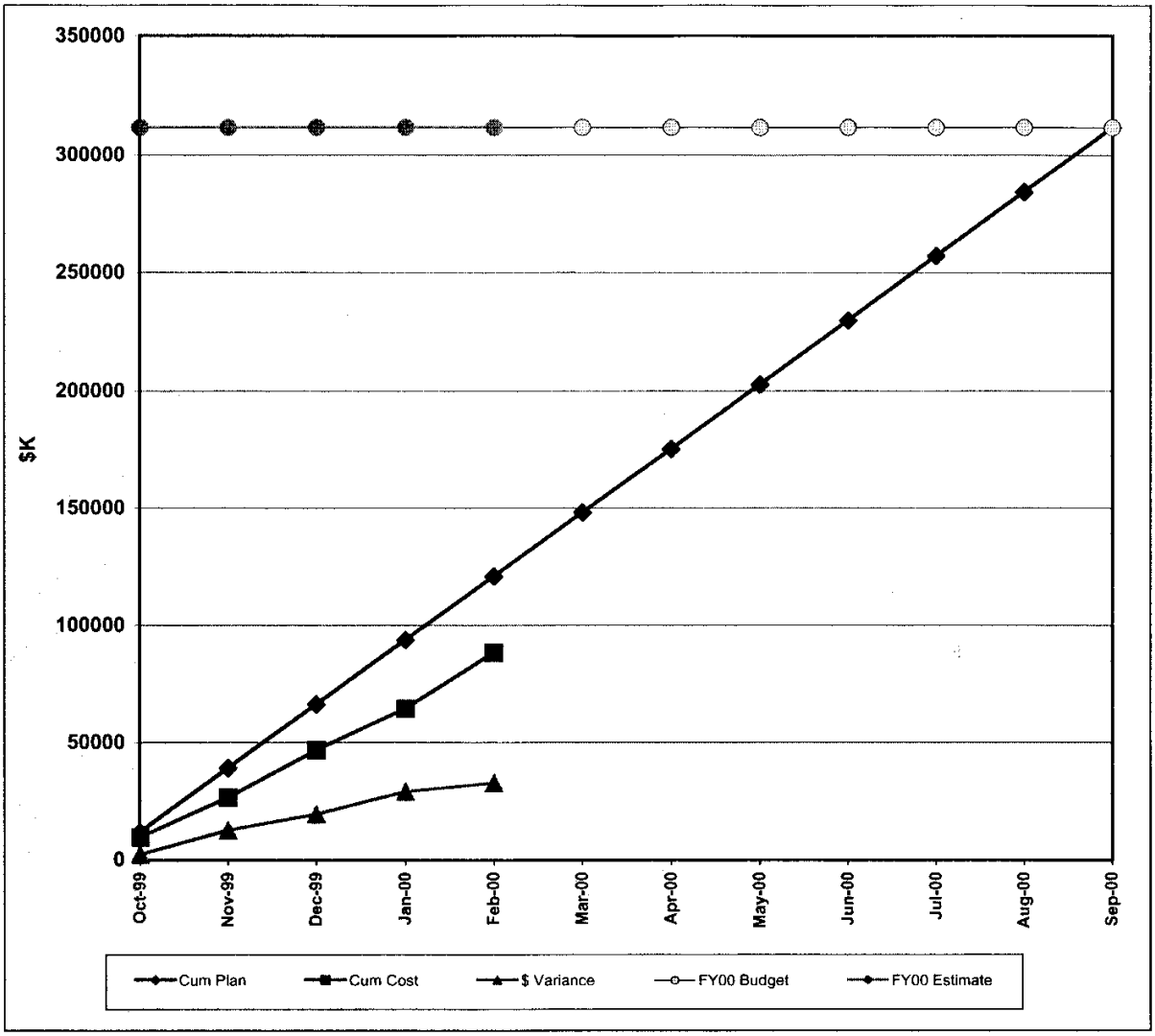
FY2000 Cost Plan to Actual
as of February 2000
Total Project Cost (TPC) ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget *	Estimate *
Oct-99	12,057	9,690	12,057	9,690	2,367	20%	311,520	311,520
Nov-99	27,224	17,043	39,281	26,733	12,548	32%	311,520	311,520
Dec-99	27,224	20,136	66,505	46,870	19,635	30%	311,520	311,520
Jan-00	27,224	17,601	93,729	64,471	29,258	31%	311,520	311,520
Feb-00	27,224	23,662	120,953	88,133	32,820	27%	311,520	311,520
Mar-00	27,224		148,176				311,520	
Apr-00	27,224		175,400				311,520	
May-00	27,224		202,624				311,520	
Jun-00	27,224		229,848				311,520	
Jul-00	27,224		257,072				311,520	
Aug-00	27,224		284,296				311,520	
Sep-00	27,224		311,520				311,520	

* Rebaselining in progress will establish Project TPC BAC/EAC.

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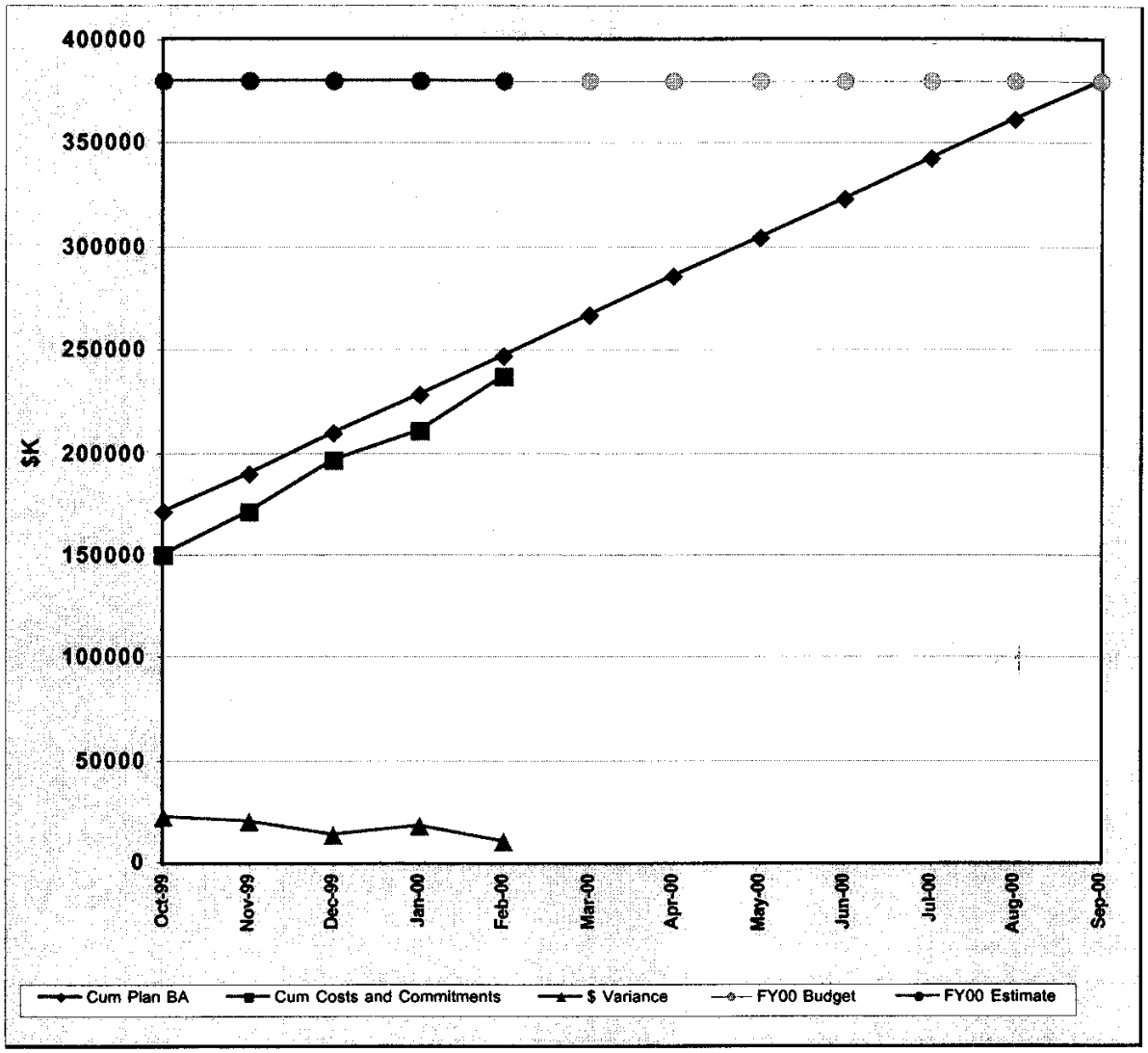
FY2000 Plan to Actual as of February 2000
Total Project Cost (TPC) - Cost and Commitments ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget *	Estimate *
Oct-99	171,009 **	149,362	171,009 **	149,362	21,647	13%	380,409	380,409
Nov-99	19,036	21,090	190,045	170,452	19,593	10%	380,409	380,409
Dec-99	19,036	25,391	209,082	195,843	13,239	6%	380,409	380,409
Jan-00	19,036	14,699	228,118	210,542	17,577	8%	380,409	380,409
Feb-00	19,036	26,800	247,155	237,342	9,813	4%	380,409	380,409
Mar-00	19,036		266,191				380,409	
Apr-00	19,036		285,227				380,409	
May-00	19,036		304,264				380,409	
Jun-00	19,036		323,300				380,409	
Jul-00	19,036		342,337				380,409	
Aug-00	19,036		361,373				380,409	
Sep-00	19,036		380,409				380,409	

* Rebaselining in progress will establish Project TPC BAC/EAC.
** Includes $126,612K of uncosted obligations from FY99.

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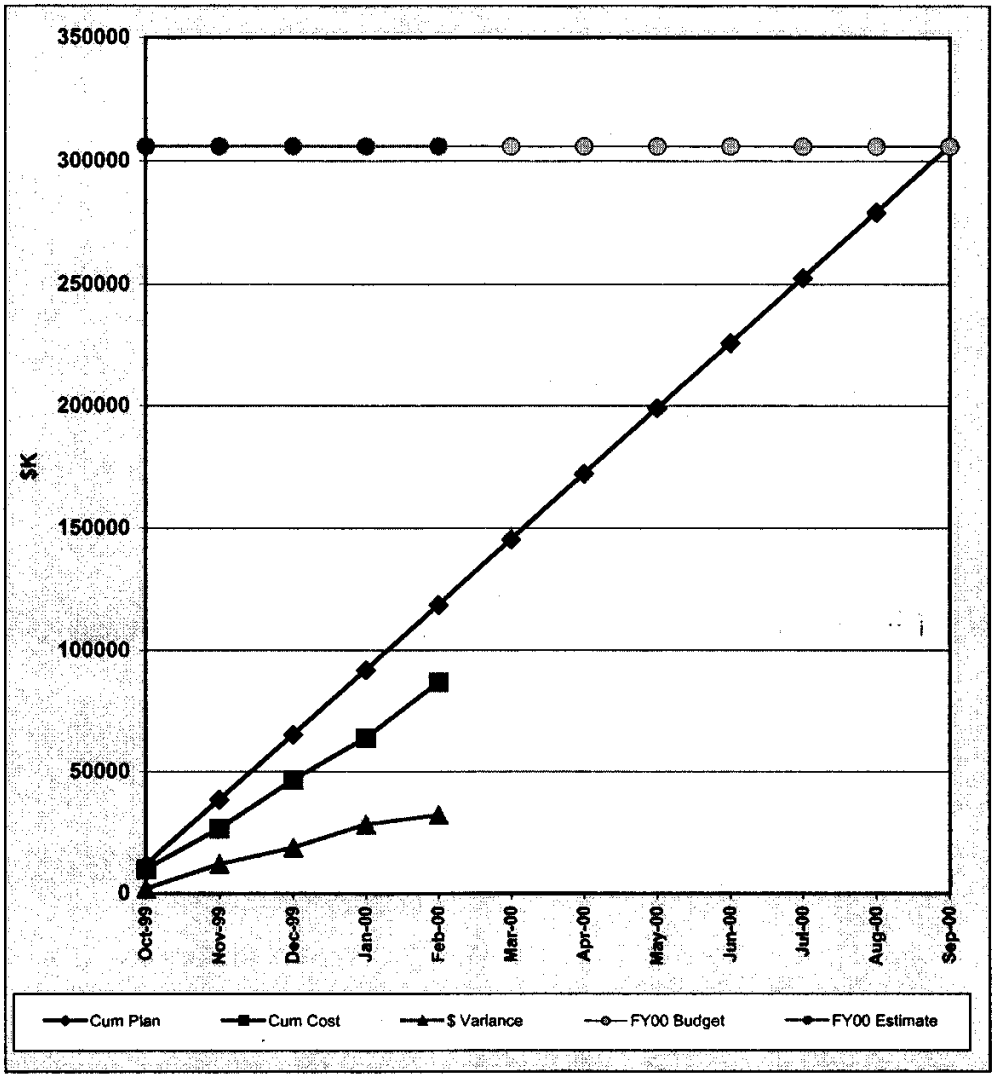
FY2000 Cost Plan to Actual
as of February 2000
Total Estimated Cost (TEC) ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget *	Estimate *
Oct-99	11,647	9,826	11,647	9,826	1,821	16%	306,054	306,054
Nov-99	26,764	16,570	38,411	26,395	12,016	31%	306,054	306,054
Dec-99	26,764	20,132	65,176	46,528	18,648	29%	306,054	306,054
Jan-00	26,764	17,295	91,940	63,823	28,117	31%	306,054	306,054
Feb-00	26,764	22,957	118,704	86,779	31,925	27%	306,054	306,054
Mar-00	26,764		145,468				306,054	
Apr-00	26,764		172,233				306,054	
May-00	26,764		198,997				306,054	
Jun-00	26,764		225,761				306,054	
Jul-00	26,764		252,526				306,054	
Aug-00	26,764		279,290				306,054	
Sep-00	26,764		306,054				306,054	

* Rebaselining in progress will establish Project TEC BAC/EAC.

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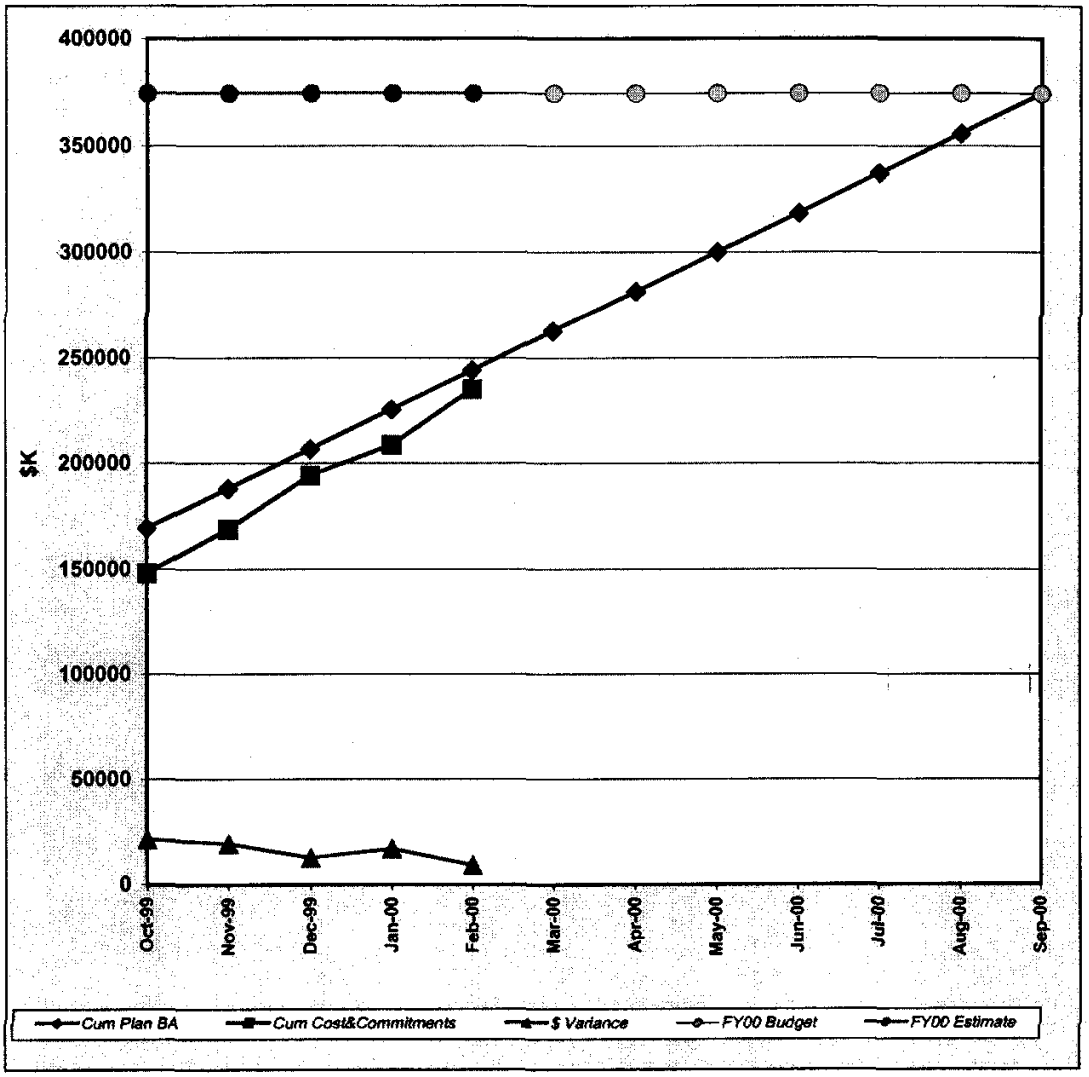
FY2000 Plan to Actual as of February 2000
Total Estimated Cost (TEC) - Cost and Commitments ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget*	Estimate
Oct-98	169,417 **	148,023	169,417 **	148,023	21,394	13%	374,416	374,416
Nov-98	18,636	20,837	188,053	168,860	19,194	10%	374,416	374,416
Dec-98	18,636	25,315	206,690	194,175	12,515	6%	374,416	374,416
Jan-99	18,636	14,429	225,326	208,604	16,722	7%	374,416	374,416
Feb-99	18,636	26,251	243,962	234,855	9,108	4%	374,416	374,416
Mar-99	18,636		262,599				374,416	
Apr-99	18,636		281,235				374,416	
May-99	18,636		299,871				374,416	
Jun-99	18,636		318,507				374,416	
Jul-99	18,636		337,144				374,416	
Aug-99	18,636		355,780				374,416	
Sep-99	18,636		374,416				374,416	

* Rebaselining in progress will establish Project TEC BAC/EAC.
** Includes $124,820K of uncosted obligations from FY99.

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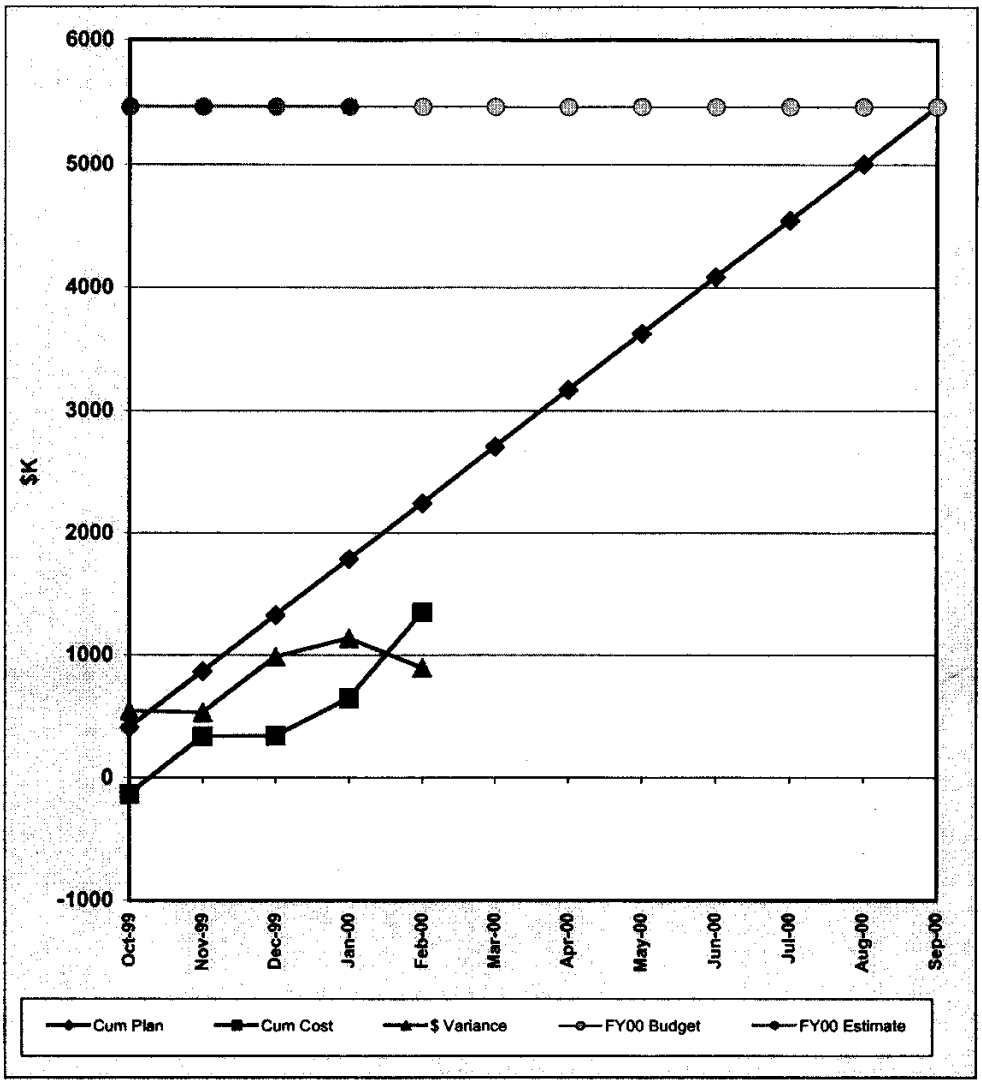
FY2000 Cost Plan to Actual
as of February 2000
Other Project Cost (OPC) ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget *	Estimate *
Oct-99	410	-135	410	-135	545	133%	5,466	5,466
Nov-99	460	474	870	338	531	61%	5,466	5,466
Dec-99	460	4	1,329	342	987	74%	5,466	5,466
Jan-00	460	306	1,789	648	1,141	64%	5,466	5,466
Feb-00	460	705	2,248	1,353	895	40%	5,466	
Mar-00	460		2,708				5,466	
Apr-00	460		3,168				5,466	
May-00	460		3,627				5,466	
Jun-00	460		4,087				5,466	
Jul-00	460		4,546				5,466	
Aug-00	460		5,006				5,466	
Sep-00	460		5,466				5,466	

* Rebaselining in progress will establish Project OPC BAC/EAC.

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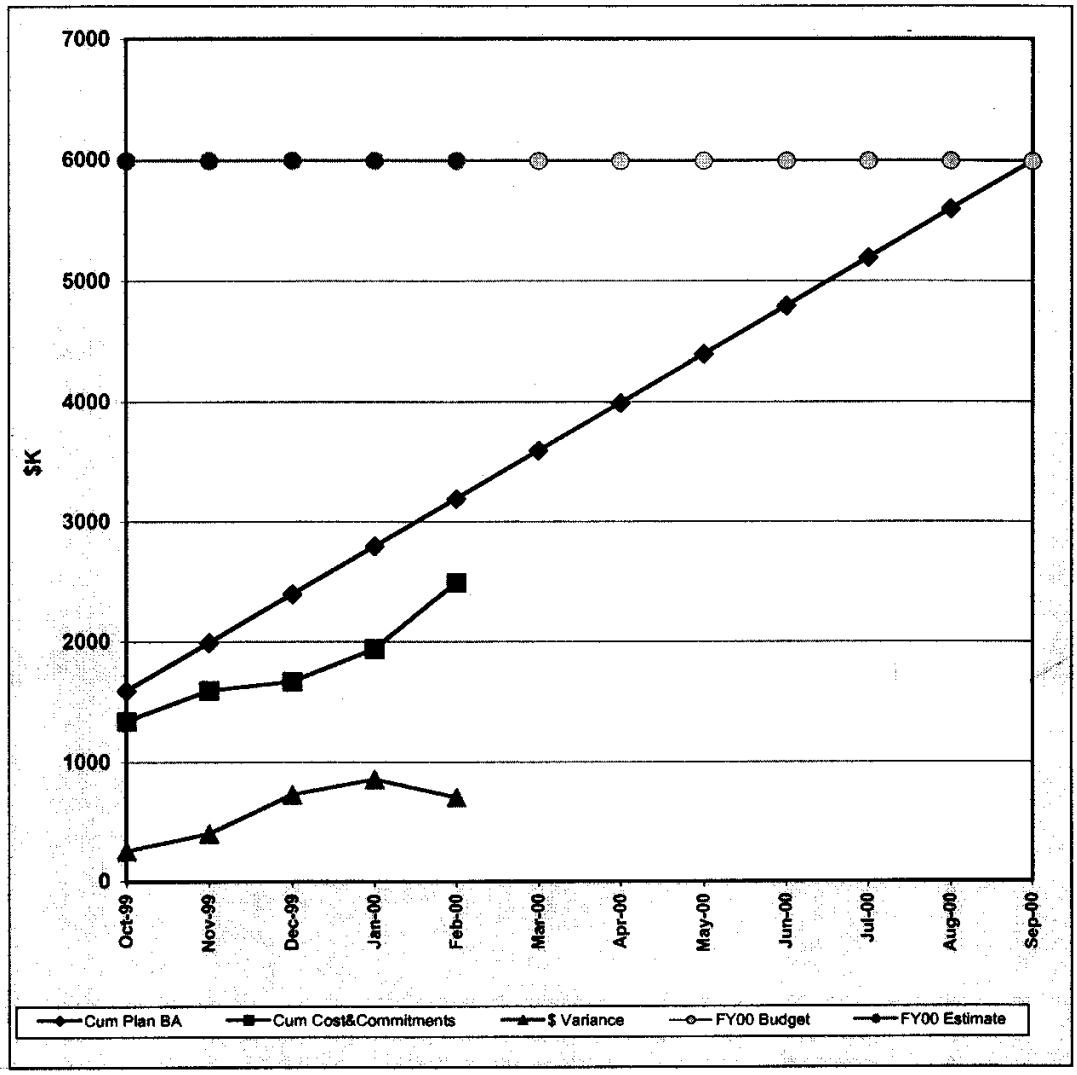
FY2000 Plan to Actual as of February 2000
Other Project Cost (OPC) - Cost and Commitments ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget *	Estimate *
Oct-99	1,592 **	1,339	1,592 **	1,339	253	16%	5,993	5,993
Nov-99	400	253	1,992	1,592	400	20%	5,993	5,993
Dec-99	400	75	2,392	1,668	724	30%	5,993	5,993
Jan-00	400	270	2,792	1,938	854	31%	5,993	5,993
Feb-00	400	549	3,192	2,487	705	22%	5,993	5,993
Mar-00	400		3,593				5,993	
Apr-00	400		3,993				5,993	
May-00	400		4,393				5,993	
Jun-00	400		4,793				5,993	
Jul-00	400		5,193				5,993	
Aug-00	400		5,593				5,993	
Sep-00	400		5,993				5,993	

* Rebaselining in progress will establish Project OPC BAC/EAC.
** Includes $1,792K of uncosted obligations from FY99.

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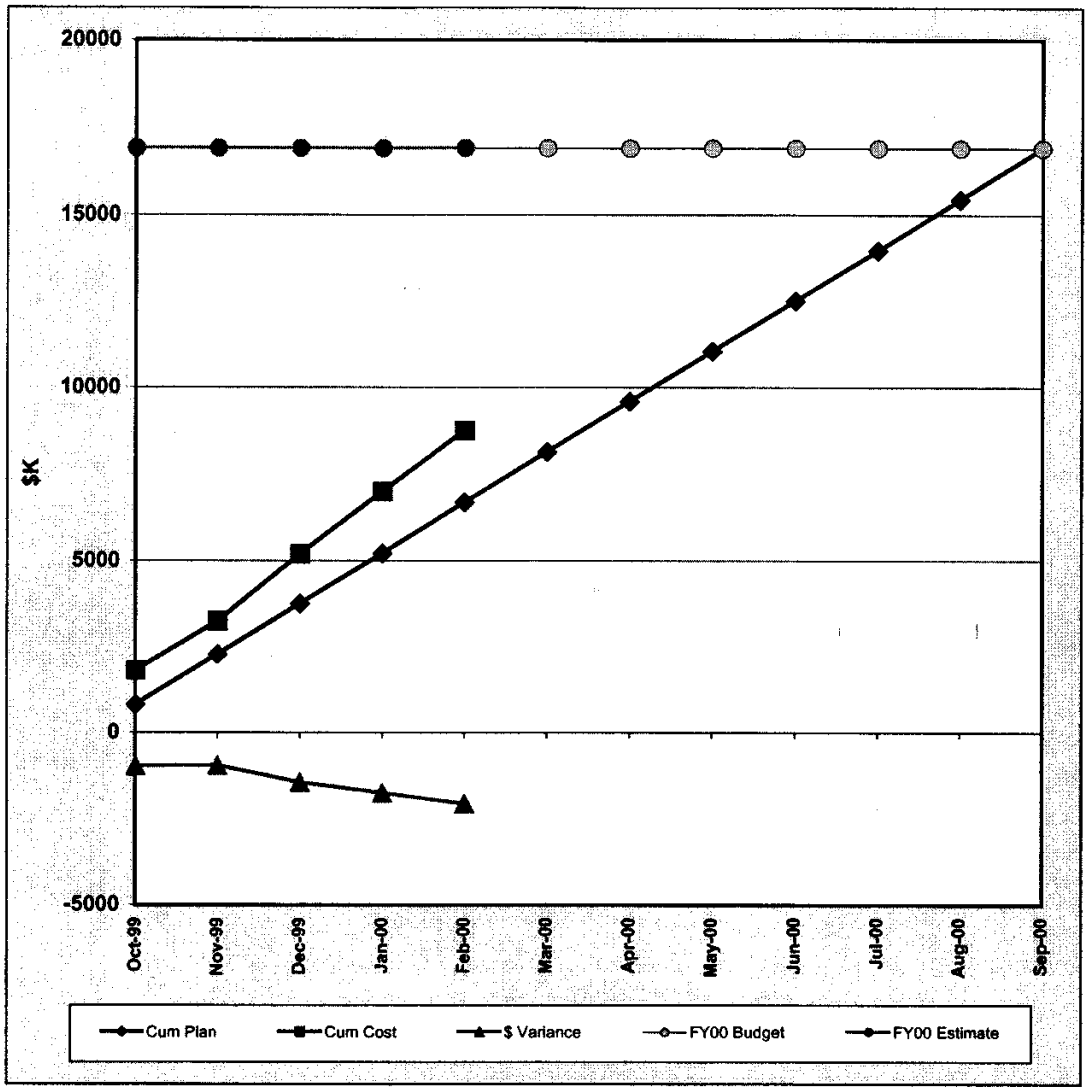
Project Number 96-D-111
February 2000

FY2000 Cost Plan to Actual as of February 2000
WBS 1.1 - Project Office Cost ($K)



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-98	821	1,812	821	1,812	-991	-121%	16,907	16,907
Nov-98	1,462	1,442	2,283	3,254	-970	-42%	16,907	16,907
Dec-98	1,462	1,943	3,746	5,197	-1,451	-39%	16,907	16,907
Jan-99	1,462	1,780	5,208	6,978	-1,769	-34%	16,907	16,907
Feb-99	1,462	1,772	6,671	8,749	-2,079	-31%	16,907	16,907
Mar-99	1,462		8,133				16,907	
Apr-99	1,462		9,595				16,907	
May-99	1,462		11,058				16,907	
Jun-99	1,462		12,520				16,907	
Jul-99	1,462		13,983				16,907	
Aug-99	1,462		15,445				16,907	
Sep-99	1,462		16,907				16,907	

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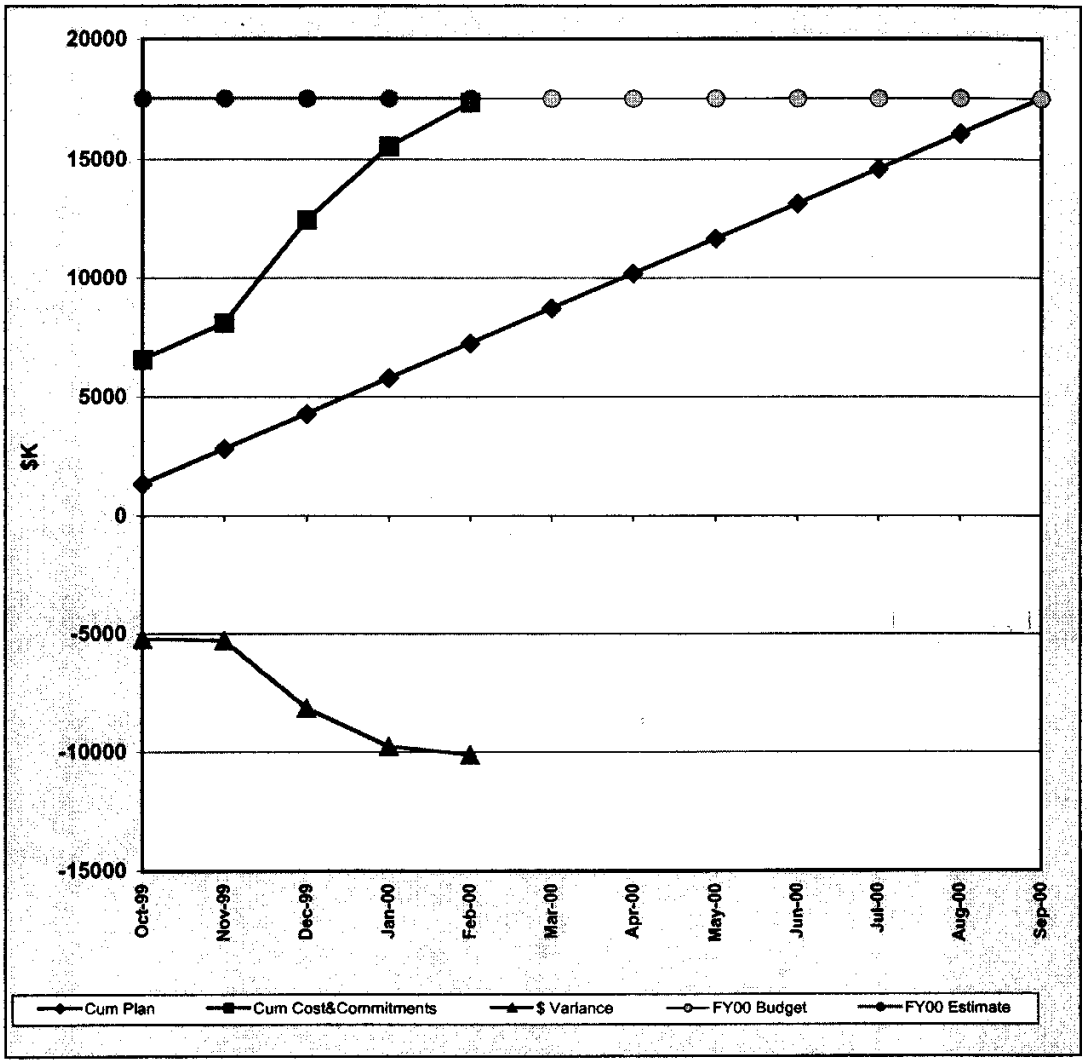
FY2000 Cost and Commitment Plan to Actual
as of February 2000
WBS 1.1 - Project Office ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-98	1,358 *	6,571	1,358 *	6,571	-5,213	-384%	17,537	17,537
Nov-98	1,471	1,531	2,829	8,103	-5,274	-186%	17,537	17,537
Dec-98	1,471	4,346	4,300	12,449	-8,149	-190%	17,537	17,537
Jan-99	1,471	3,092	5,770	15,541	-9,771	-169%	17,537	17,537
Feb-99	1,471	1,830	7,241	17,371	-10,130	-140%	17,537	17,537
Mar-99	1,471		8,712				17,537	
Apr-99	1,471		10,183				17,537	
May-99	1,471		11,654				17,537	
Jun-99	1,471		13,124				17,537	
Jul-99	1,471		14,595				17,537	
Aug-99	1,471		16,066				17,537	
Sep-99	1,471		17,537				17,537	

* Includes $4,263K of uncosted obligations from FY99.

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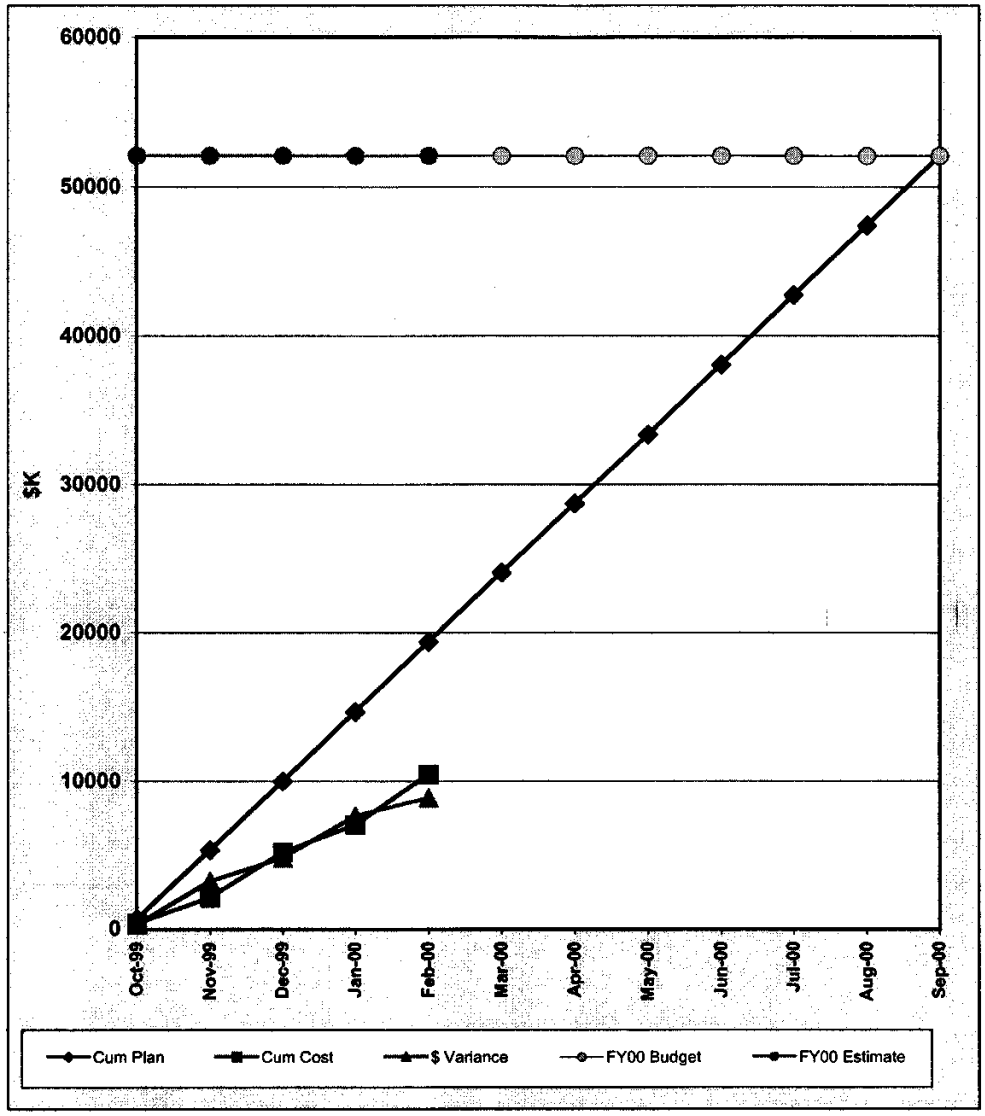
Project Number 96-D-111
February 2000

FY2000 Cost Plan to Actual as of February 2000
WBS 1.2 - Site and Conventional
Facilities Cost ($K)



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-98	664	363	664	363	301	45%	52,090	52,090
Nov-98	4,675	1,767	5,339	2,130	3,209	60%	52,090	52,090
Dec-98	4,675	3,057	10,014	5,187	4,827	48%	52,090	52,090
Jan-99	4,675	1,852	14,689	7,040	7,650	52%	52,090	52,090
Feb-99	4,675	3,442	19,364	10,481	8,883	46%	52,090	52,090
Mar-99	4,675		24,040				52,090	
Apr-99	4,675		28,715				52,090	
May-99	4,675		33,390				52,090	
Jun-99	4,675		38,065				52,090	
Jul-99	4,675		42,740				52,090	
Aug-99	4,675		47,415				52,090	
Sep-99	4,675		52,090				52,090	

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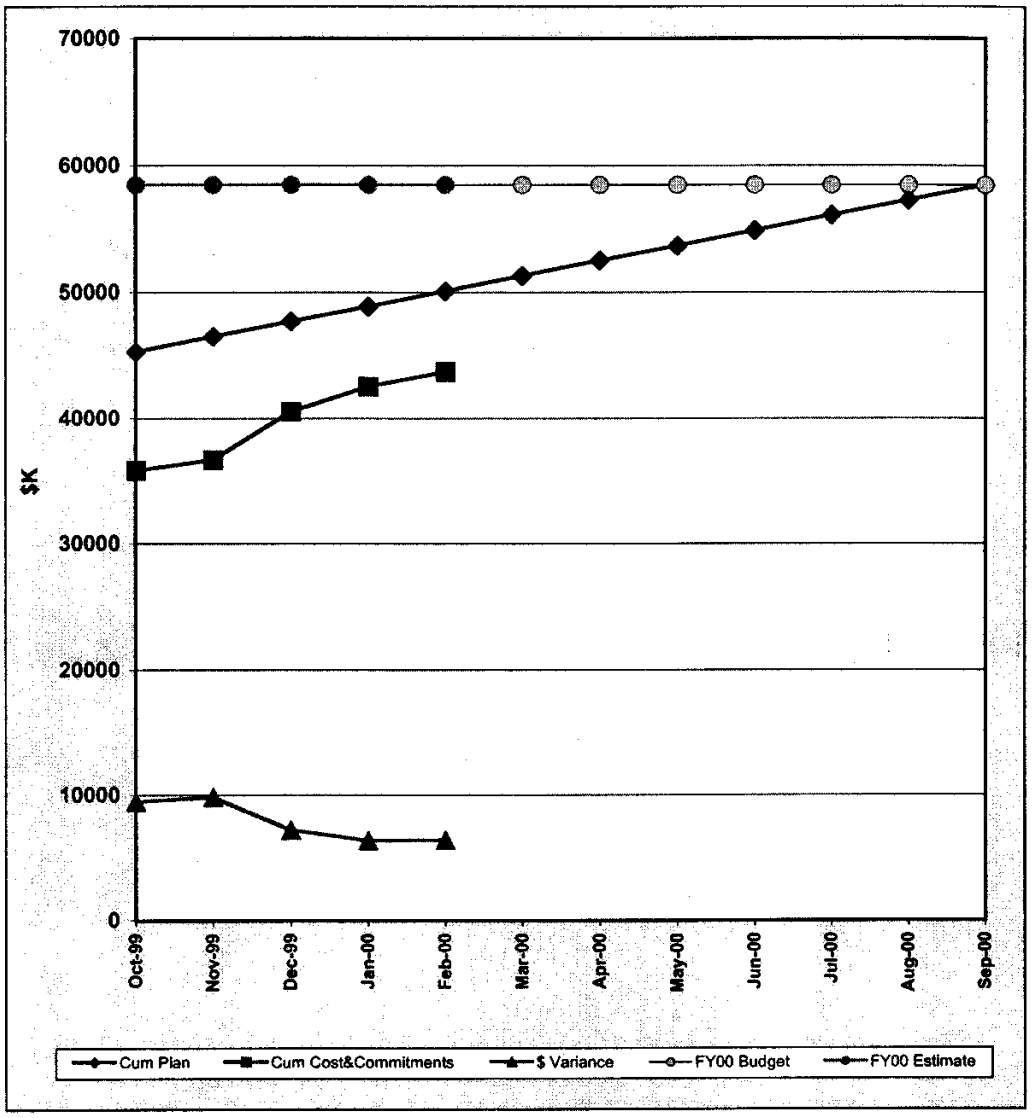
FY2000 Cost and Commitment Plan to Actual
as of February 2000
WBS 1.2 - Site and Conventional Facilities ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-98	45,320 *	35,825	45,320 *	35,825	9,495	21%	58,466	58,466
Nov-98	1,195	860	46,515	36,685	9,830	21%	58,466	58,466
Dec-98	1,195	3,842	47,710	40,527	7,184	15%	58,466	58,466
Jan-99	1,195	2,016	48,905	42,543	6,363	13%	58,466	58,466
Feb-99	1,195	1,143	50,100	43,685	6,415	13%	58,466	58,466
Mar-99	1,195		51,296				58,466	
Apr-99	1,195		52,491				58,466	
May-99	1,195		53,686				58,466	
Jun-99	1,195		54,881				58,466	
Jul-99	1,195		56,076				58,466	
Aug-99	1,195		57,271				58,466	
Sep-99	1,195		58,466				58,466	

* Includes $34,968K of uncosted obligations from FY99.

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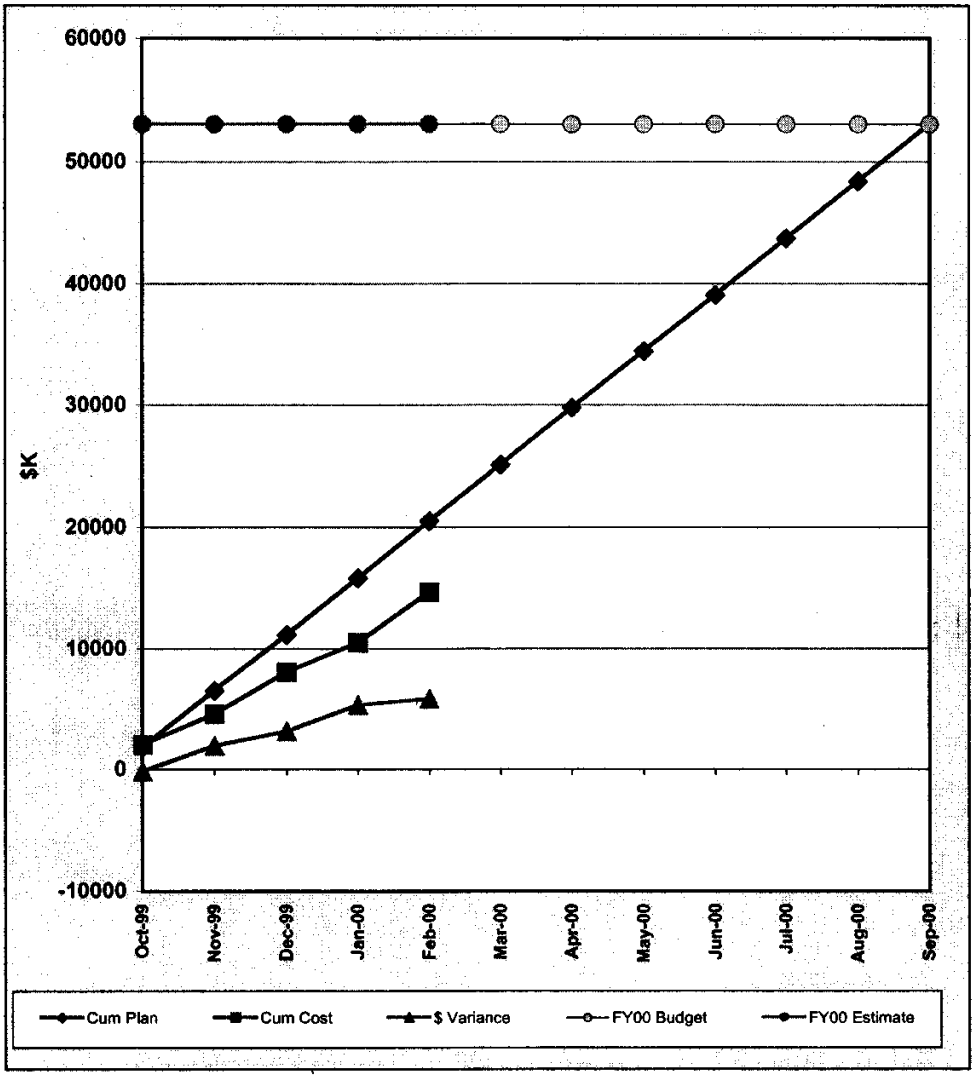
Project Number 96-D-111
February 2000

FY2000 Cost Plan to Actual
as of February 2000
WBS 1.3 - Lasers Systems ($K)



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-98	1,849	2,050	1,849	2,050	-201	-11%	53,083	53,083
Nov-98	4,658	2,517	6,507	4,567	1,939	30%	53,083	53,083
Dec-98	4,658	3,455	11,164	8,023	3,142	28%	53,083	53,083
Jan-99	4,658	2,463	15,822	10,485	5,336	34%	53,083	53,083
Feb-99	4,658	4,157	20,479	14,642	5,837	29%	53,083	53,083
Mar-99	4,658		25,137				53,083	
Apr-99	4,658		29,795				53,083	
May-99	4,658		34,452				53,083	
Jun-99	4,658		39,110				53,083	
Jul-99	4,658		43,767				53,083	
Aug-99	4,658		48,425				53,083	
Sep-99	4,658		53,083				53,083	

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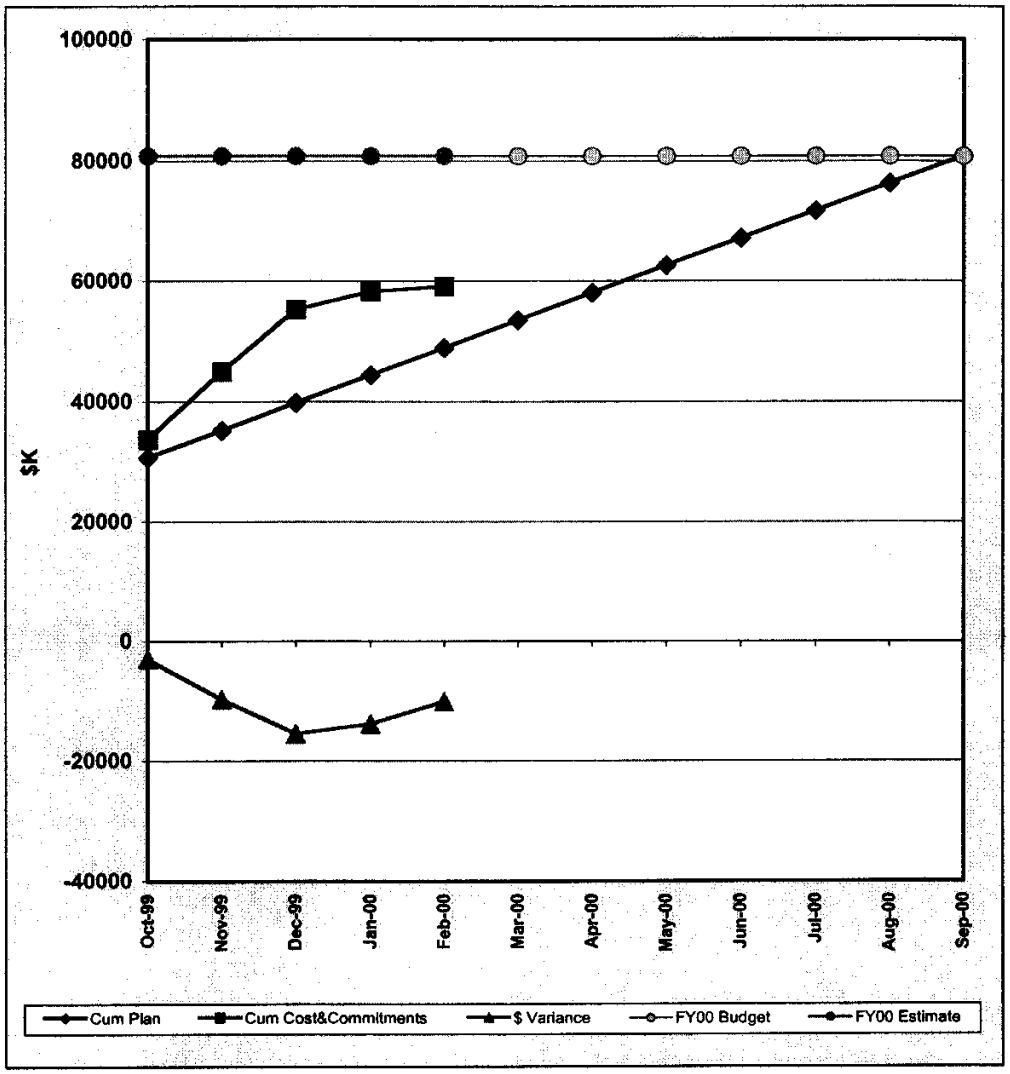
FY2000 Cost and Commitment Plan to Actual
as of February 2000
WBS 1.3 - Lasers Systems ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-98	30,661 *	33,683	30,661 *	33,683	-3,022	-10%	80,840	80,840
Nov-98	4,562	11,269	35,223	44,952	-9,729	-28%	80,840	80,840
Dec-98	4,562	10,316	39,784	55,268	-15,484	-39%	80,840	80,840
Jan-99	4,562	2,990	44,346	58,259	-13,912	-31%	80,840	80,840
Feb-99	4,562	775	48,908	59,033	-10,125	-21%	80,840	80,840
Mar-99	4,562		53,470				80,840	
Apr-99	4,562		58,031				80,840	
May-99	4,562		62,593				80,840	
Jun-99	4,562		67,155				80,840	
Jul-99	4,562		71,716				80,840	
Aug-99	4,562		76,278				80,840	
Sep-99	4,562		80,840				80,840	

* Includes $25,645K of uncosted obligations from FY99.

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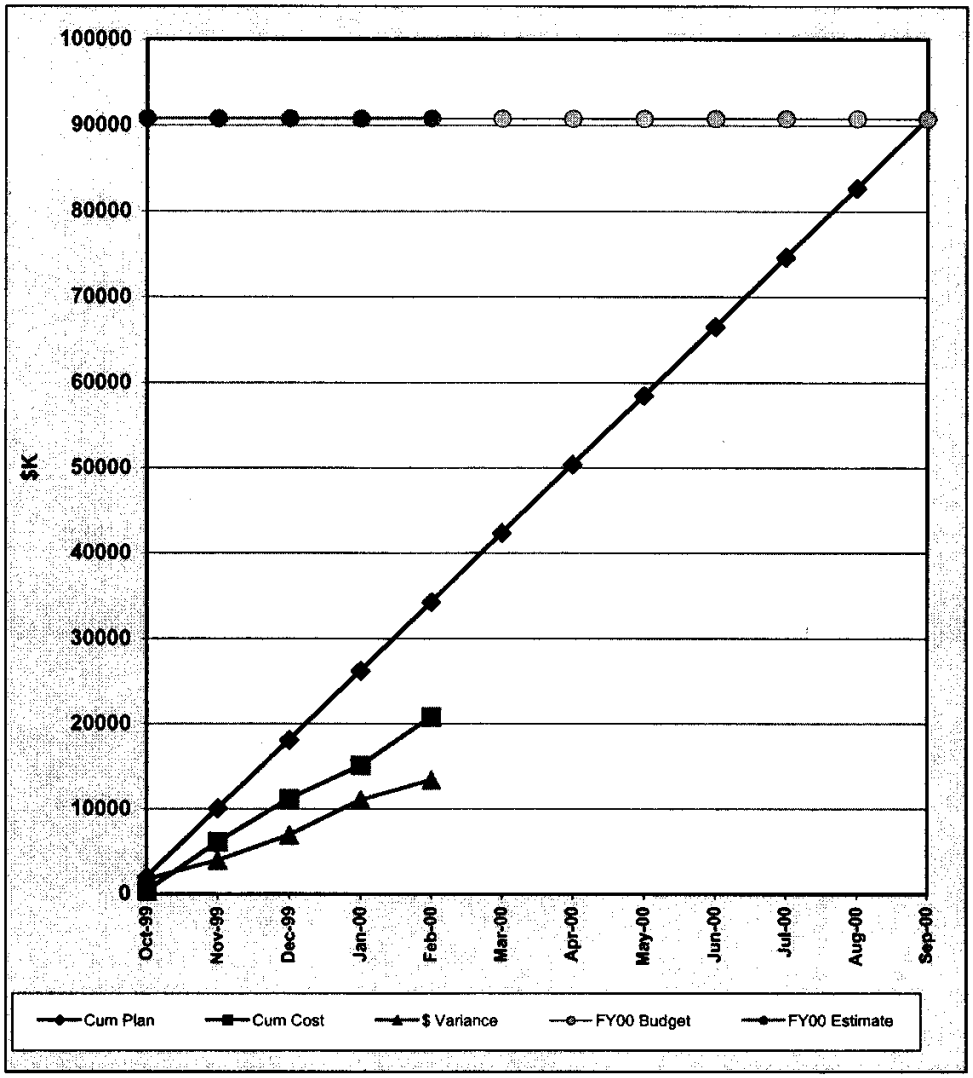
FY2000 Cost Plan to Actual
as of February 2000
WBS 1.4 - Beam Transport Systems($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	1,993	312	1,993	312	1,681	84%	90,764	90,764
Nov-99	8,070	5,793	10,063	6,106	3,957	39%	90,764	90,764
Dec-99	8,070	5,116	18,133	11,222	6,912	38%	90,764	90,764
Jan-00	8,070	3,928	26,203	15,150	11,054	42%	90,764	90,764
Feb-00	8,070	5,692	34,273	20,842	13,431	39%	90,764	90,764
Mar-00	8,070		42,344				90,764	
Apr-00	8,070		50,414				90,764	
May-00	8,070		58,484				90,764	
Jun-00	8,070		66,554				90,764	
Jul-00	8,070		74,624				90,764	
Aug-00	8,070		82,694				90,764	
Sep-00	8,070		90,764				90,764	

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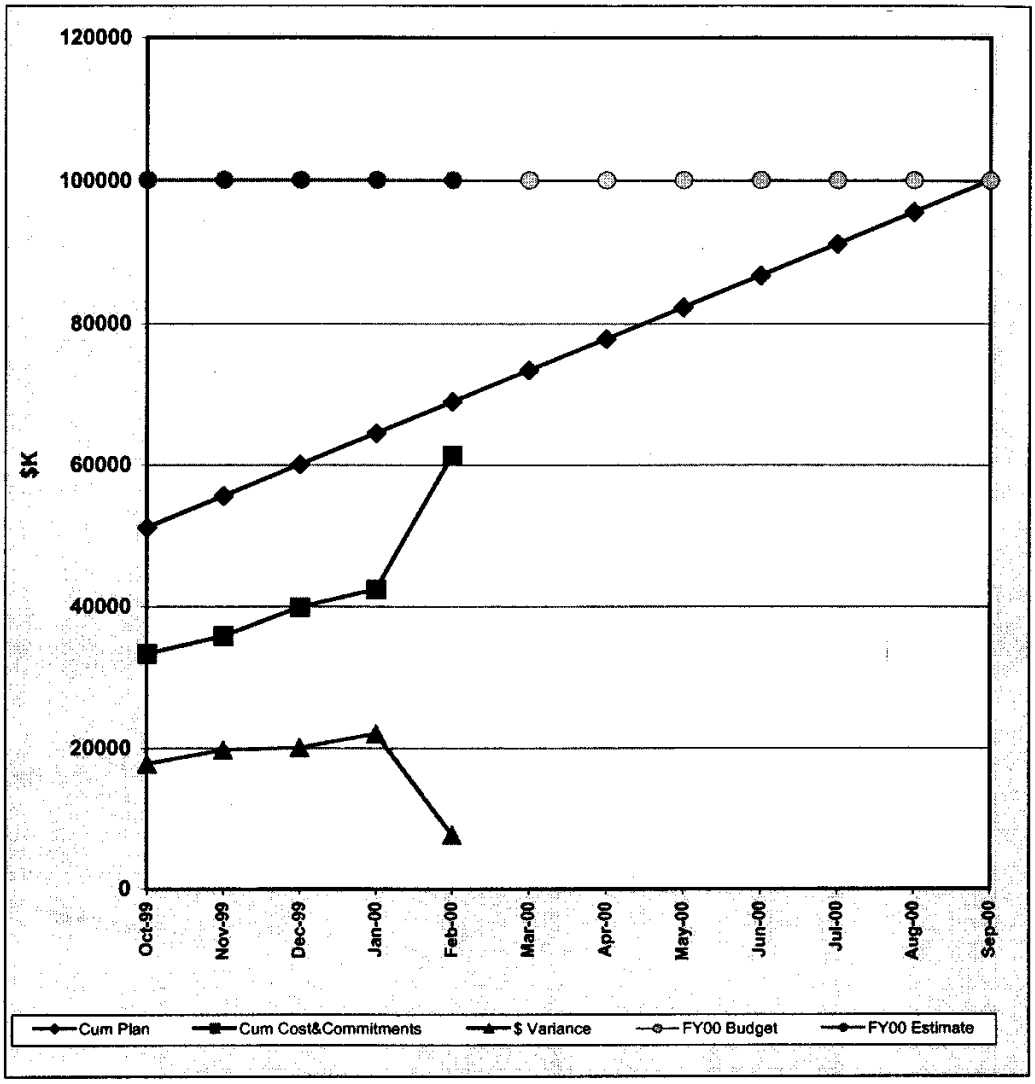
FY2000 Cost and Commitment Plan to Actual
as of February 2000
WBS 1.4 - BeamTransport Systems ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	51,134 *	33,394	51,134 *	33,394	17,740	35%	100,106	100,106
Nov-99	4,452	2,457	55,586	35,850	19,736	36%	100,106	100,106
Dec-99	4,452	4,109	60,038	39,960	20,078	33%	100,106	100,106
Jan-00	4,452	2,535	64,490	42,495	21,995	34%	100,106	100,106
Feb-00	4,452	18,832	68,942	61,327	7,615	11%	100,106	100,106
Mar-00	4,452		73,394				100,106	
Apr-00	4,452		77,846				100,106	
May-00	4,452		82,298				100,106	
Jun-00	4,452		86,750				100,106	
Jul-00	4,452		91,202				100,106	
Aug-00	4,452		95,654				100,106	
Sep-00	4,452		100,106				100,106	

* Includes $34,782K of uncosted obligations from FY99.

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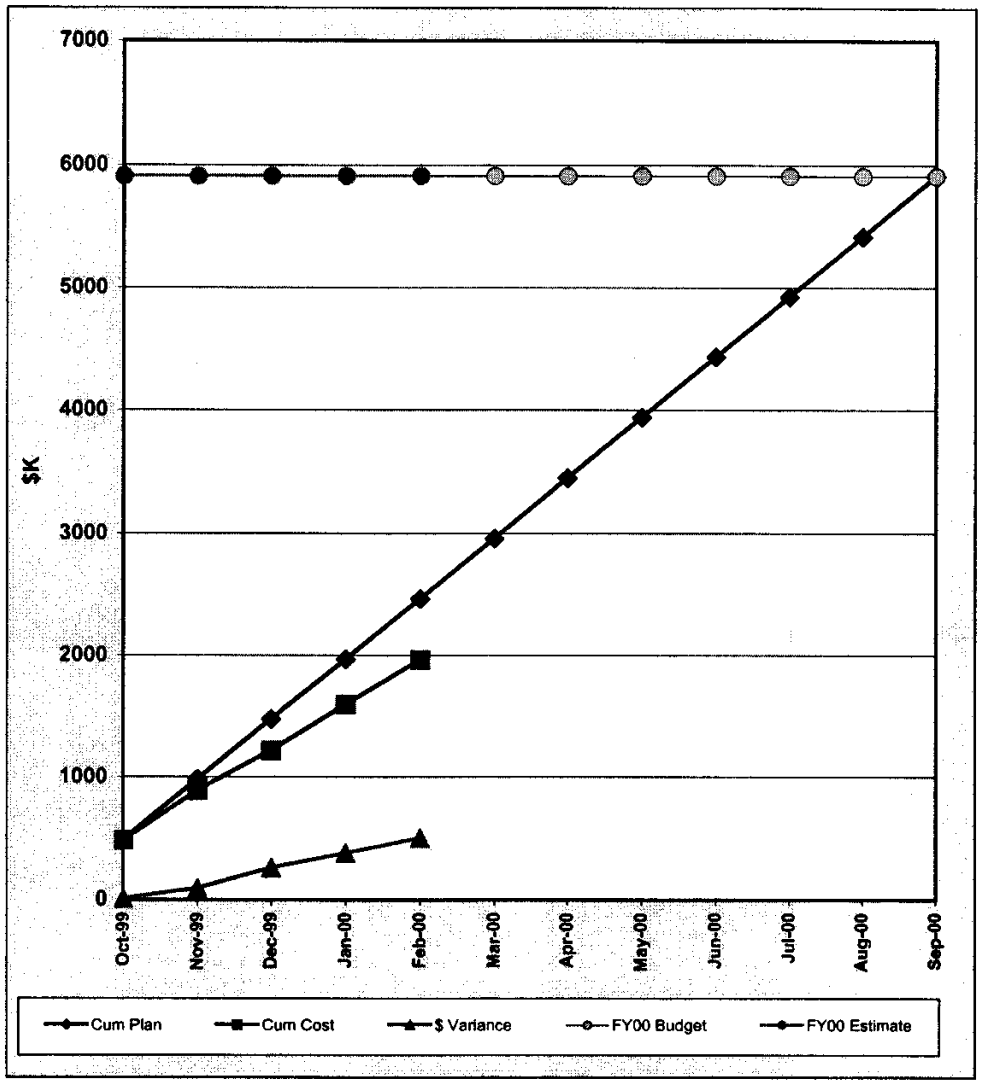
FY2000 Cost Plan to Actual
as of February 2000
WBS 1.5 - Integrated Computer Control ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	489	482	489	482	7	1%	5,914	5,914
Nov-99	493	407	982	889	93	10%	5,914	5,914
Dec-99	493	328	1,475	1,217	258	17%	5,914	5,914
Jan-00	493	374	1,969	1,591	377	19%	5,914	5,914
Feb-00	493	369	2,462	1,960	502	20%	5,914	5,914
Mar-00	493		2,955				5,914	
Apr-00	493		3,448				5,914	
May-00	493		3,941				5,914	
Jun-00	493		4,435				5,914	
Jul-00	493		4,928				5,914	
Aug-00	493		5,421				5,914	
Sep-00	493		5,914				5,914	

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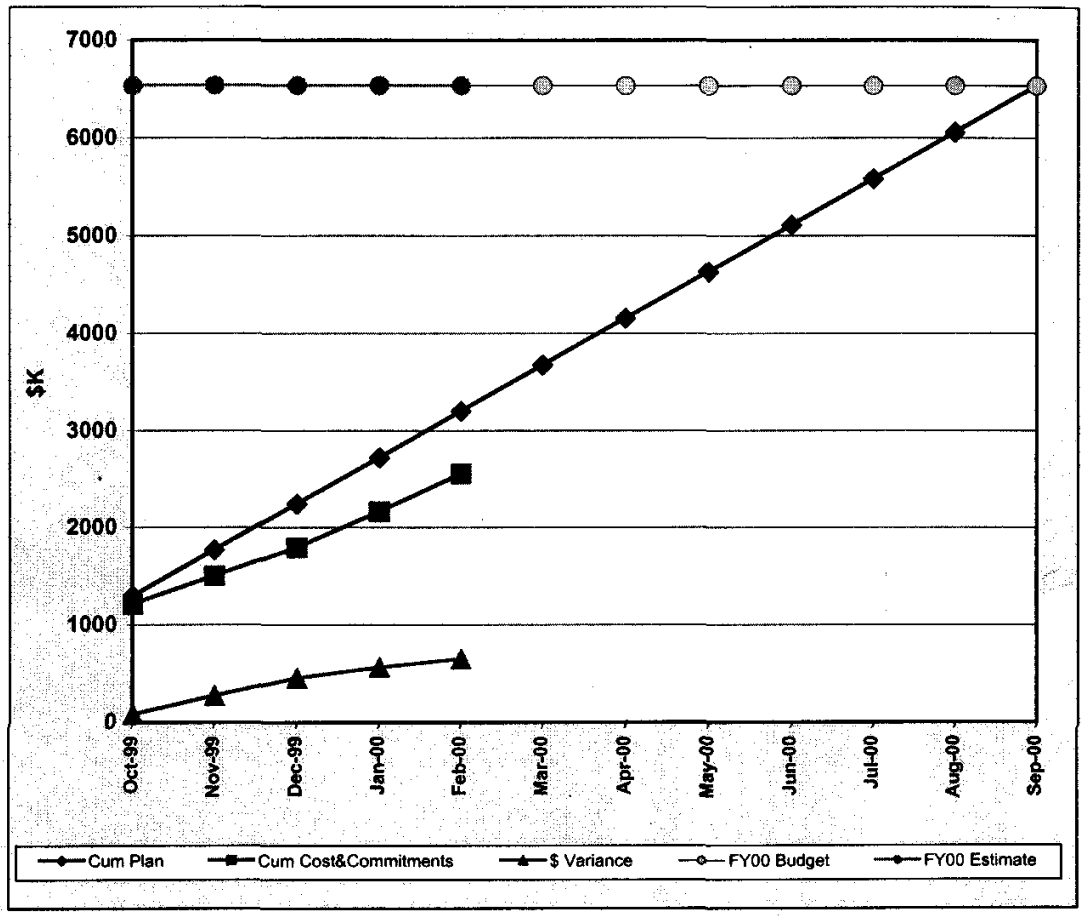
FY2000 Cost and Commitment Plan to Actual
as of February 2000
WBS 1.5 - Integrated
Computer Control ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	1,294 *	1,211	1,294 *	1,211	83	6%	6,536	6,536
Nov-99	477	287	1,771	1,498	273	15%	6,536	6,536
Dec-99	477	299	2,247	1,797	450	20%	6,536	6,536
Jan-00	477	369	2,724	2,166	557	20%	6,536	6,536
Feb-00	477	388	3,200	2,554	646	20%	6,536	6,536
Mar-00	477		3,677				6,536	
Apr-00	477		4,153				6,536	
May-00	477		4,630				6,536	
Jun-00	477		5,106				6,536	
Jul-00	477		5,583				6,536	
Aug-00	477		6,059				6,536	
Sep-00	477		6,536				6,536	

* Includes $750K of uncosted obligations from FY99.

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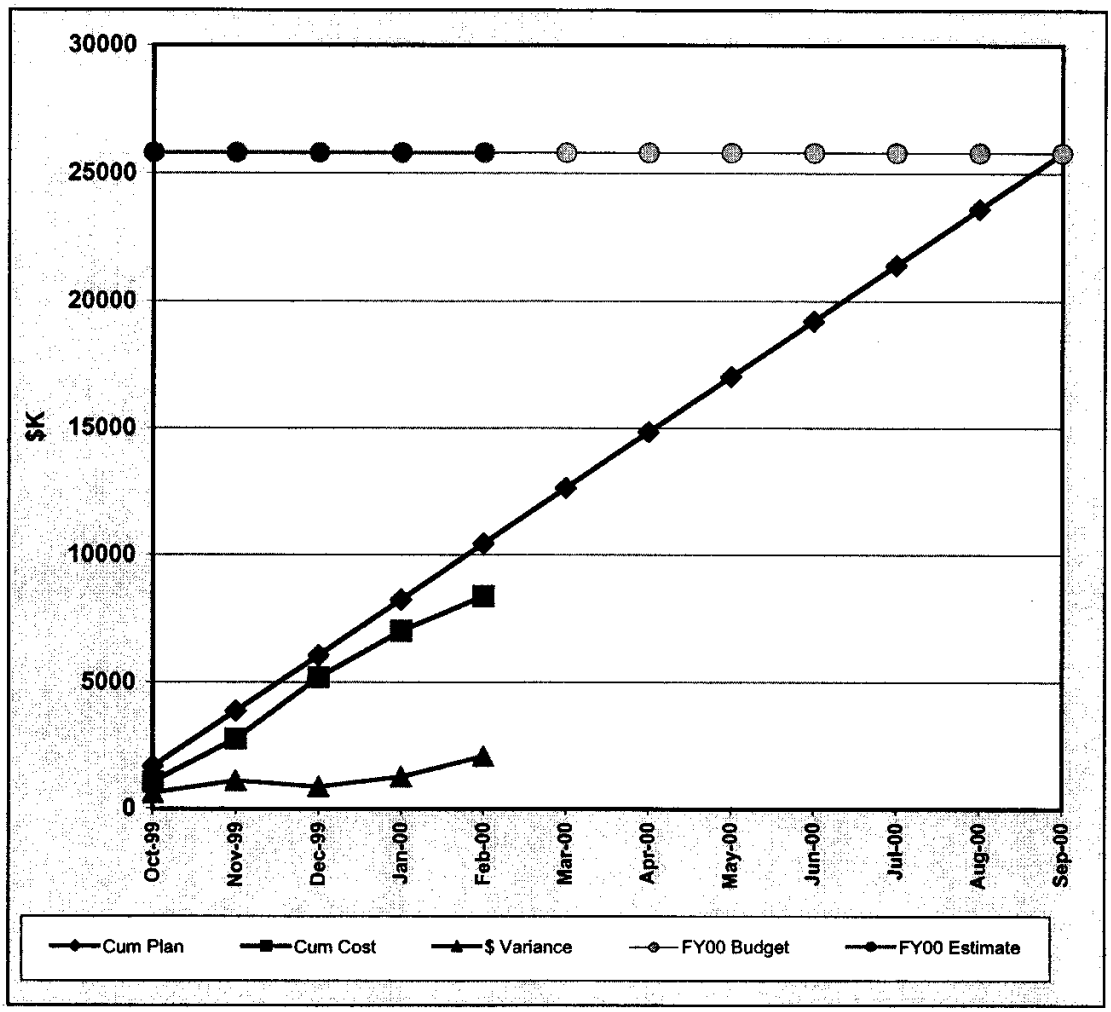
FY2000 Cost Plan to Actual
as of February 2000
WBS 1.6 - Optical Components ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	1,681	1,067	1,681	1,067	614	37%	25,798	25,798
Nov-99	2,192	1,704	3,873	2,771	1,102	28%	25,798	25,798
Dec-99	2,193	2,422	6,066	5,193	873	14%	25,798	25,798
Jan-00	2,193	1,810	8,258	7,003	1,255	15%	25,798	25,798
Feb-00	2,193	1,377	10,451	8,380	2,071	20%	25,798	25,798
Mar-00	2,193		12,643				25,798	
Apr-00	2,193		14,836				25,798	
May-00	2,193		17,028				25,798	
Jun-00	2,193		19,221				25,798	
Jul-00	2,193		21,413				25,798	
Aug-00	2,193		23,606				25,798	
Sep-00	2,193		25,798				25,798	

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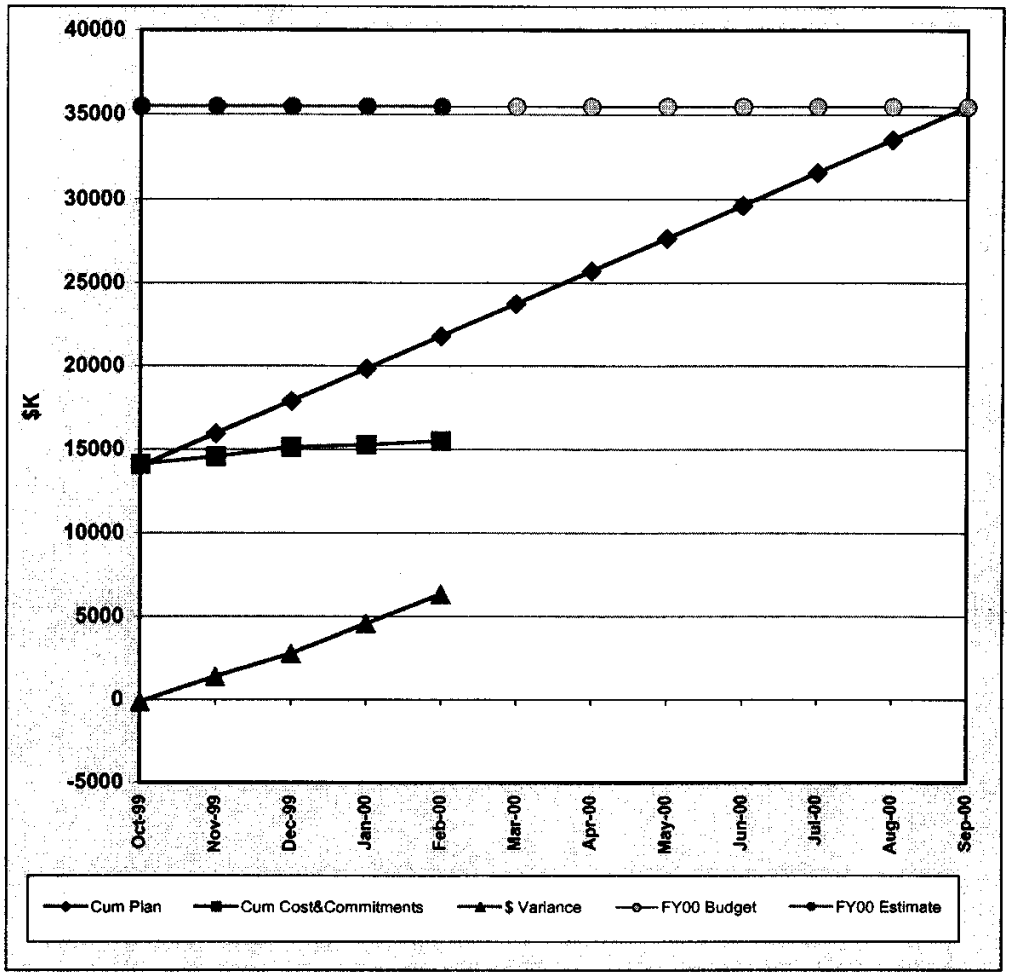
FY2000 Cost and Commitment Plan to Actual
as of February 2000
WBS 1.6 - Optical Components ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	13,984 *	14,124	13,984 *	14,124	-140	-1%	35,473	35,473
Nov-99	1,954	441	15,938	14,565	1,373	9%	35,473	35,473
Dec-99	1,954	570	17,891	15,135	2,756	15%	35,473	35,473
Jan-00	1,954	131	19,845	15,266	4,579	23%	35,473	35,473
Feb-00	1,954	223	21,798	15,489	6,309	29%	35,473	35,473
Mar-00	1,954		23,752				35,473	
Apr-00	1,954		25,705				35,473	
May-00	1,954		27,659				35,473	
Jun-00	1,954		29,612				35,473	
Jul-00	1,954		31,566				35,473	
Aug-00	1,954		33,519				35,473	
Sep-00	1,954		35,473				35,473	

* Includes $12,620K of uncosted obligations from FY99.

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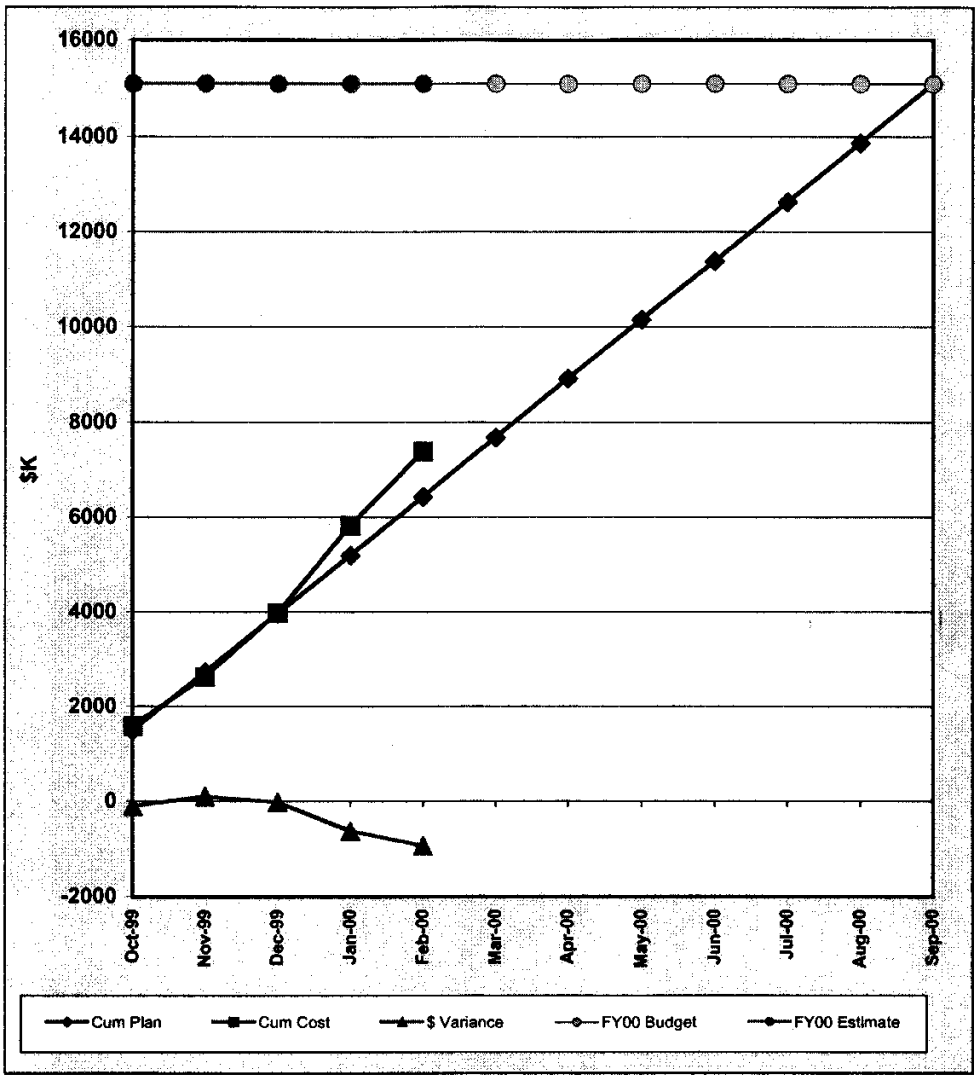
FY2000 Cost Plan to Actual as of February 2000
WBS 1.7 - Laser Control ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	1,483	1,582	1,483	1,582	-99	-7%	15,103	15,103
Nov-99	1,238	1,042	2,721	2,625	97	4%	15,103	15,103
Dec-99	1,238	1,351	3,959	3,976	-17	0%	15,103	15,103
Jan-00	1,238	1,851	5,198	5,827	-629	-12%	15,103	15,103
Feb-00	1,238	1,547	6,436	7,374	-938	-15%	15,103	15,103
Mar-00	1,238		7,674				15,103	
Apr-00	1,238		8,912				15,103	
May-00	1,238		10,150				15,103	
Jun-00	1,238		11,389				15,103	
Jul-00	1,238		12,627				15,103	
Aug-00	1,238		13,865				15,103	
Sep-00	1,238		15,103				15,103	

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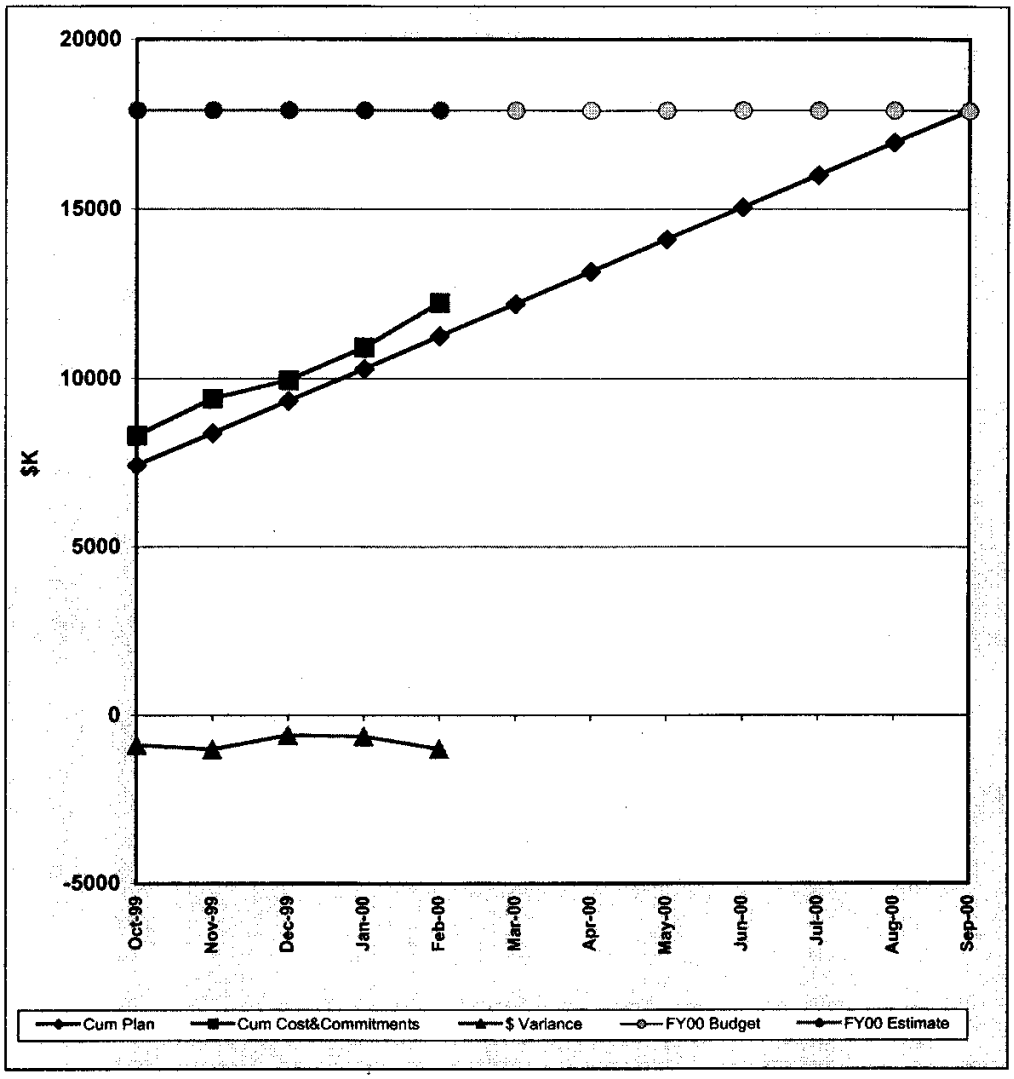
FY2000 Cost and Commitment Plan to Actual
as of February 2000
WBS 1.7 - Laser Control ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	7,429 *	8,309	7,429 *	8,309	-880	-12%	17,914	17,914
Nov-99	953	1,089	8,382	9,398	-1,016	-12%	17,914	17,914
Dec-99	953	544	9,335	9,942	-607	-6%	17,914	17,914
Jan-00	953	982	10,289	10,924	-636	-6%	17,914	17,914
Feb-00	953	1,312	11,242	12,236	-994	-9%	17,914	17,914
Mar-00	953		12,195				17,914	
Apr-00	953		13,148				17,914	
May-00	953		14,101				17,914	
Jun-00	953		15,055				17,914	
Jul-00	953		16,008				17,914	
Aug-00	953		16,961				17,914	
Sep-00	953		17,914				17,914	

* Includes $4,136K of uncosted obligations from FY99.

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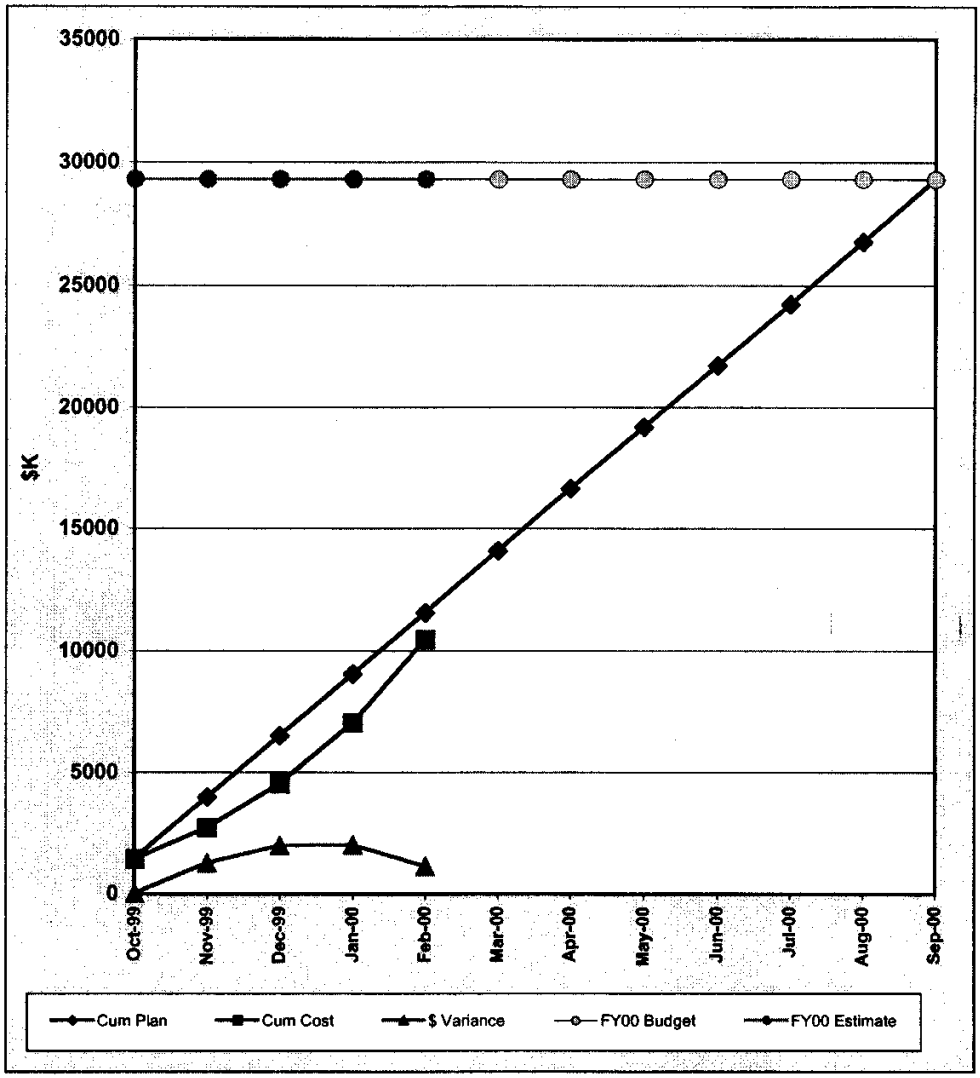
FY2000 Cost Plan to Actual
as of February 2000
WBS 1.8 - Target Experimental System ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	1,458	1,429	1,458	1,429	29	2%	29,303	29,303
Nov-99	2,531	1,296	3,989	2,725	1,264	32%	29,303	29,303
Dec-99	2,531	1,806	6,521	4,531	1,990	31%	29,303	29,303
Jan-00	2,531	2,521	9,052	7,052	2,000	22%	29,303	29,303
Feb-00	2,531	3,410	11,584	10,462	1,122	10%	29,303	29,303
Mar-00	2,531		14,115				29,303	
Apr-00	2,531		16,646				29,303	
May-00	2,531		19,178				29,303	
Jun-00	2,531		21,709				29,303	
Jul-00	2,531		24,241				29,303	
Aug-00	2,531		26,772				29,303	
Sep-00	2,531		29,303				29,303	

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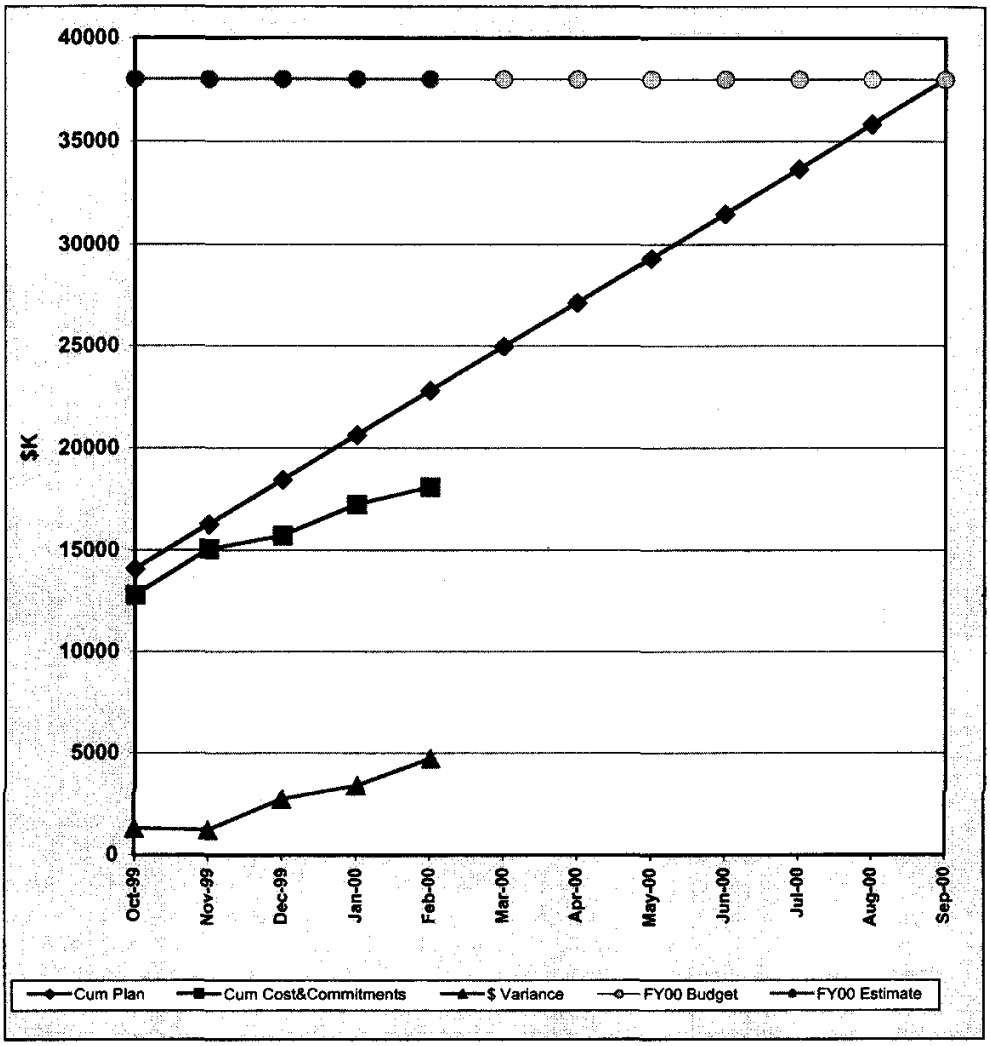
FY2000 Cost and Commitment Plan to Actual
as of February 2000
WBS 1.8 - Target Experimental System ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	14,093 *	12,805	14,093 *	12,805	1,288	9%	38,008	38,008
Nov-99	2,174	2,246	16,267	15,050	1,217	7%	38,008	38,008
Dec-99	2,174	670	18,441	15,720	2,721	15%	38,008	38,008
Jan-00	2,174	1,496	20,615	17,216	3,399	16%	38,008	38,008
Feb-00	2,174	855	22,789	18,071	4,718	21%	38,008	38,008
Mar-00	2,174		24,964				38,008	
Apr-00	2,174		27,138				38,008	
May-00	2,174		29,312				38,008	
Jun-00	2,174		31,486				38,008	
Jul-00	2,174		33,660				38,008	
Aug-00	2,174		35,834				38,008	
Sep-00	2,174		38,008				38,008	

* Includes $6,252K of uncosted obligations from FY99.

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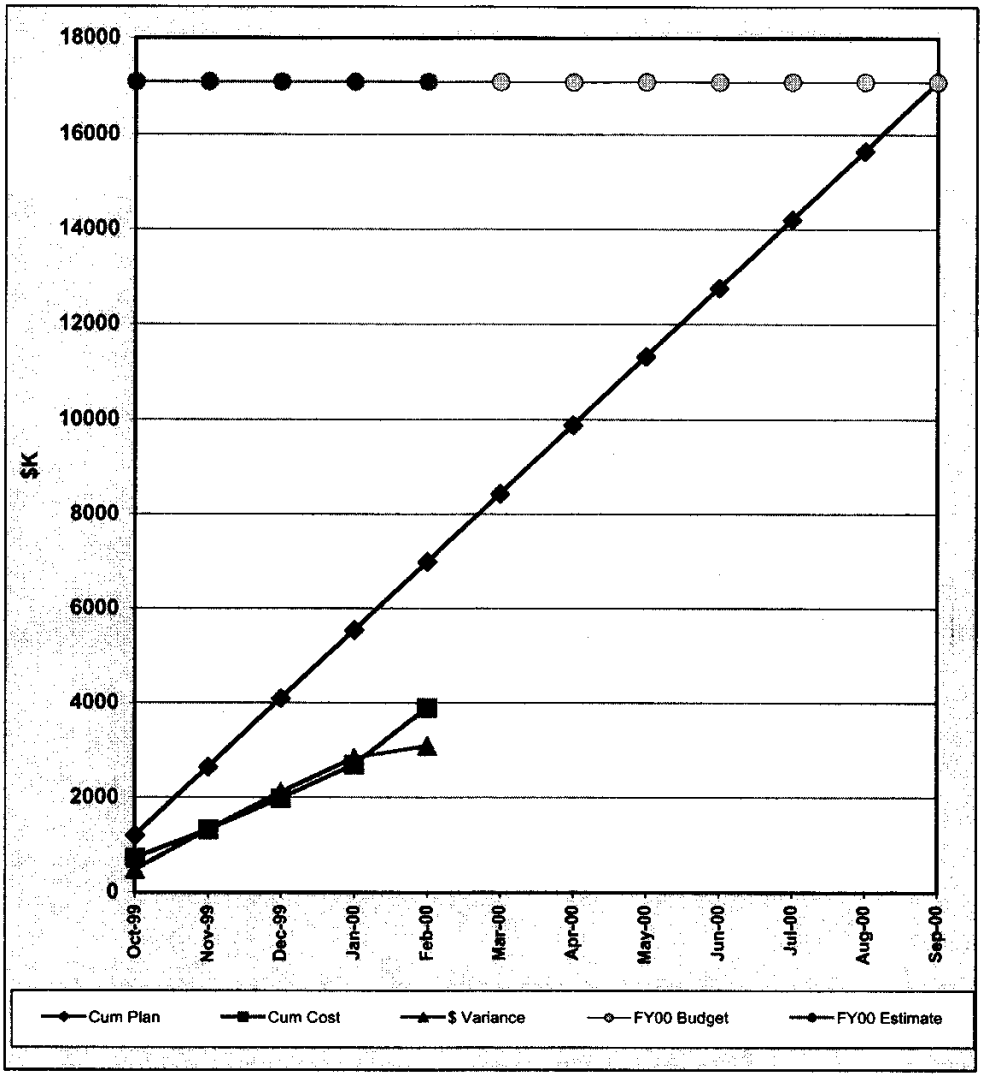
FY2000 Cost Plan to Actual
as of February 2000
WBS 1.9 - Operations Special Equipment ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	1,209	728	1,209	728	481	40%	17,091	17,091
Nov-99	1,444	601	2,653	1,329	1,324	50%	17,091	17,091
Dec-99	1,444	653	4,097	1,982	2,115	52%	17,091	17,091
Jan-00	1,444	716	5,540	2,698	2,843	51%	17,091	17,091
Feb-00	1,444	1,191	6,984	3,889	3,095	44%	17,091	17,091
Mar-00	1,444		8,428				17,091	
Apr-00	1,444		9,872				17,091	
May-00	1,444		11,316				17,091	
Jun-00	1,444		12,759				17,091	
Jul-00	1,444		14,203				17,091	
Aug-00	1,444		15,647				17,091	
Sep-00	1,444		17,091				17,091	

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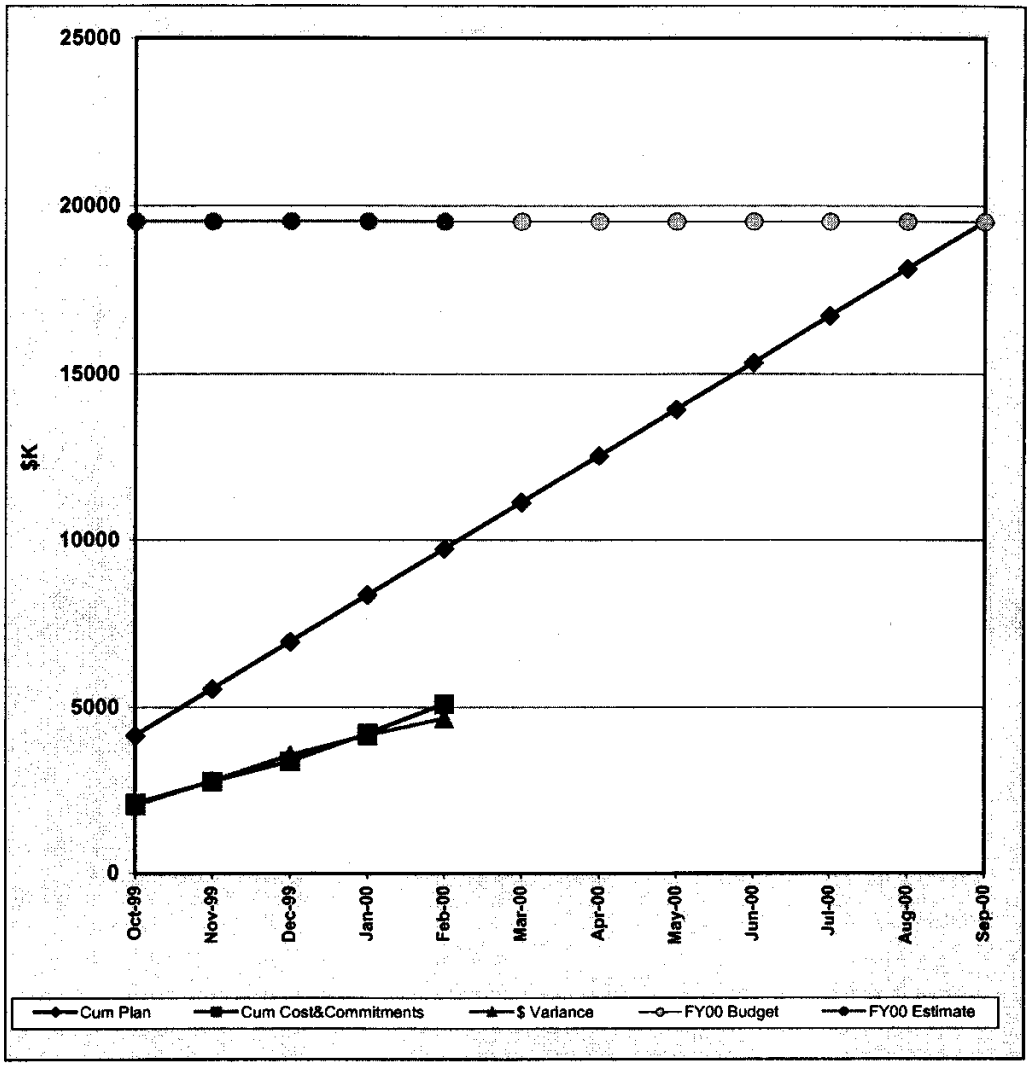
FY2000 Cost and Commitment Plan to Actual
as of February 2000
WBS 1.9 - Operations
Special Equipment ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	4,144 *	2,102	4,144 *	2,102	2,042	49%	19,537	19,537
Nov-99	1,399	657	5,543	2,759	2,784	50%	19,537	19,537
Dec-99	1,399	618	6,943	3,377	3,566	51%	19,537	19,537
Jan-00	1,399	817	8,342	4,194	4,148	50%	19,537	19,537
Feb-00	1,399	894	9,742	5,088	4,654	48%	19,537	19,537
Mar-00	1,399		11,141				19,537	
Apr-00	1,399		12,540				19,537	
May-00	1,399		13,940				19,537	
Jun-00	1,399		15,339				19,537	
Jul-00	1,399		16,739				19,537	
Aug-00	1,399		18,138				19,537	
Sep-00	1,399		19,537				19,537	

* Includes $1,404K of uncosted obligations from FY99.

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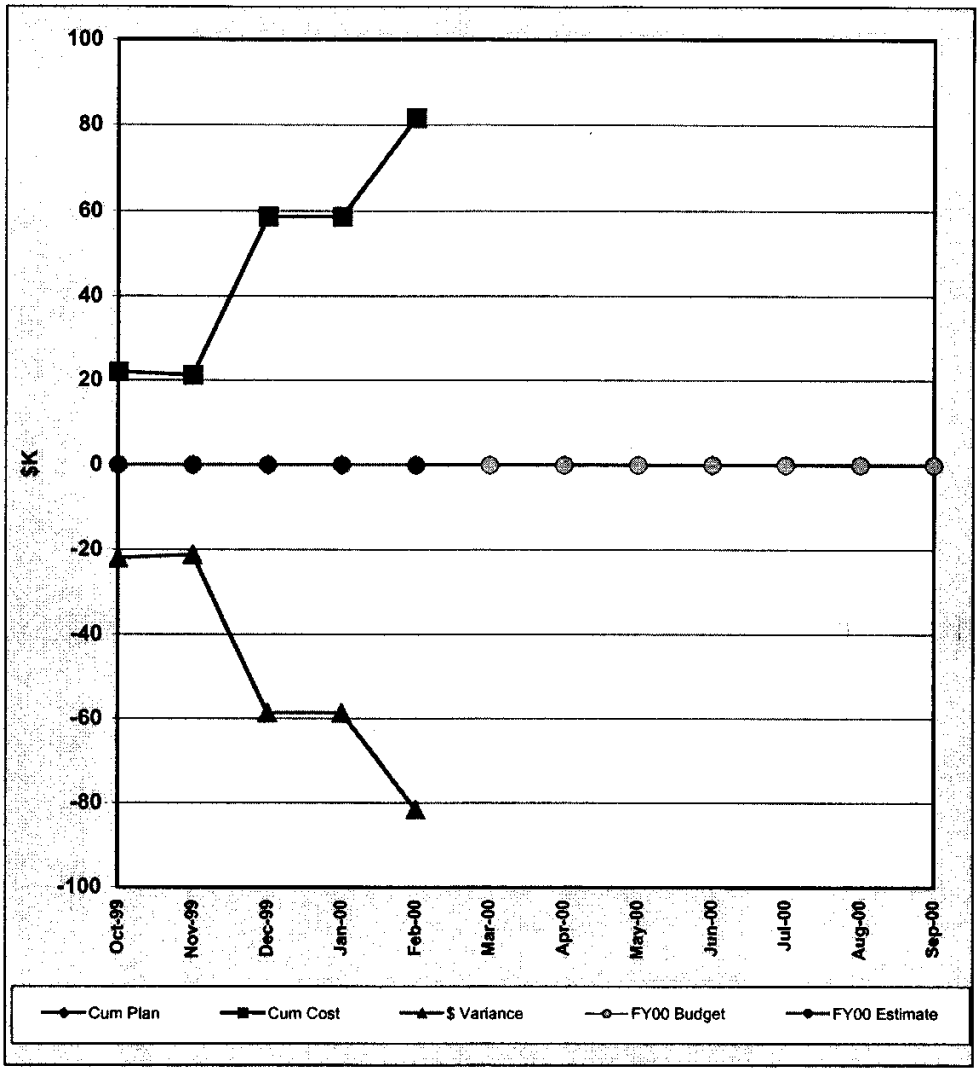
FY2000 Cost Plan to Actual
as of February 2000
WBS 1.10 - Start-up Activities ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned*	Actual	Planned	Actual	$ Var	% Var	Budget*	Estimate
Oct-99	0	22	0	22	-22	#DIV/0!	0	-
Nov-99	0	-1	0	21	-21	#DIV/0!	0	-
Dec-99	0	37	0	59	-59	#DIV/0!	0	-
Jan-00	0	0	0	59	-59	#DIV/0!	0	-
Feb-00	0	23	0	82	-82	#DIV/0!	0	
Mar-00	0		0				0	
Apr-00	0		0				0	
May-00	0		0				0	
Jun-00	0		0				0	
Jul-00	0		0				0	
Aug-00	0		0				0	
Sep-00	0		0				0	

* Plan will be prepared and budgeted.

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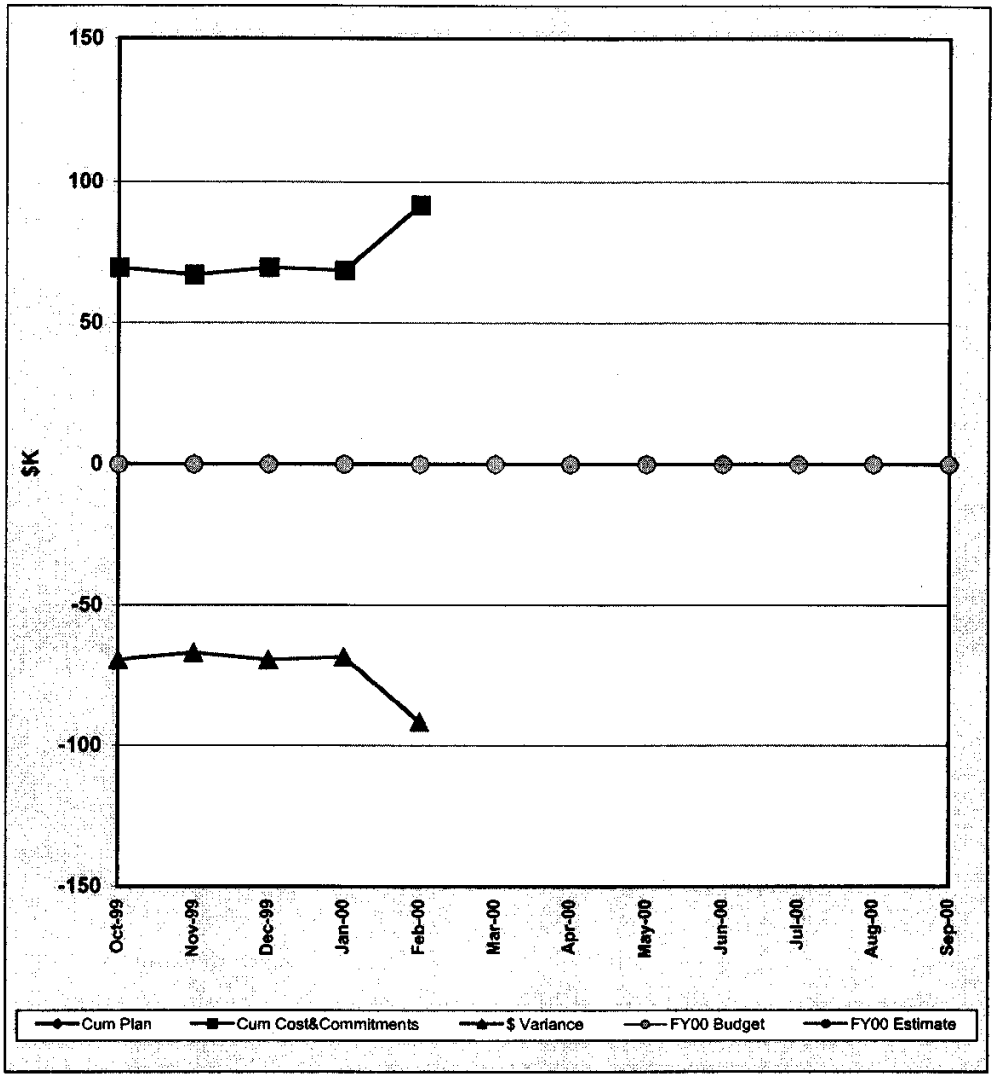
FY2000 Cost and Commitment Plan to Actual
as of February 2000
WBS 1.10 - Start-up Activities ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned*	Actual	Planned	Actual	$ Var	% Var	Budget*	Estimate
Oct-99	0	70	0	70	-70	#DIV/0!	0	0
Nov-99	0	-2	0	67	-67	#DIV/0!	0	0
Dec-99	0	3	0	70	-70	#DIV/0!	0	0
Jan-00	0	-1	0	69	-69	#DIV/0!	0	0
Feb-00	0	23	0	92	-92	#DIV/0!	0	0
Mar-00	0		0				0	
Apr-00	0		0				0	
May-00	0		0				0	
Jun-00	0		0				0	
Jul-00	0		0				0	
Aug-00	0		0				0	
Sep-00	0		0				0	

* Plan will be prepared and budgeted.

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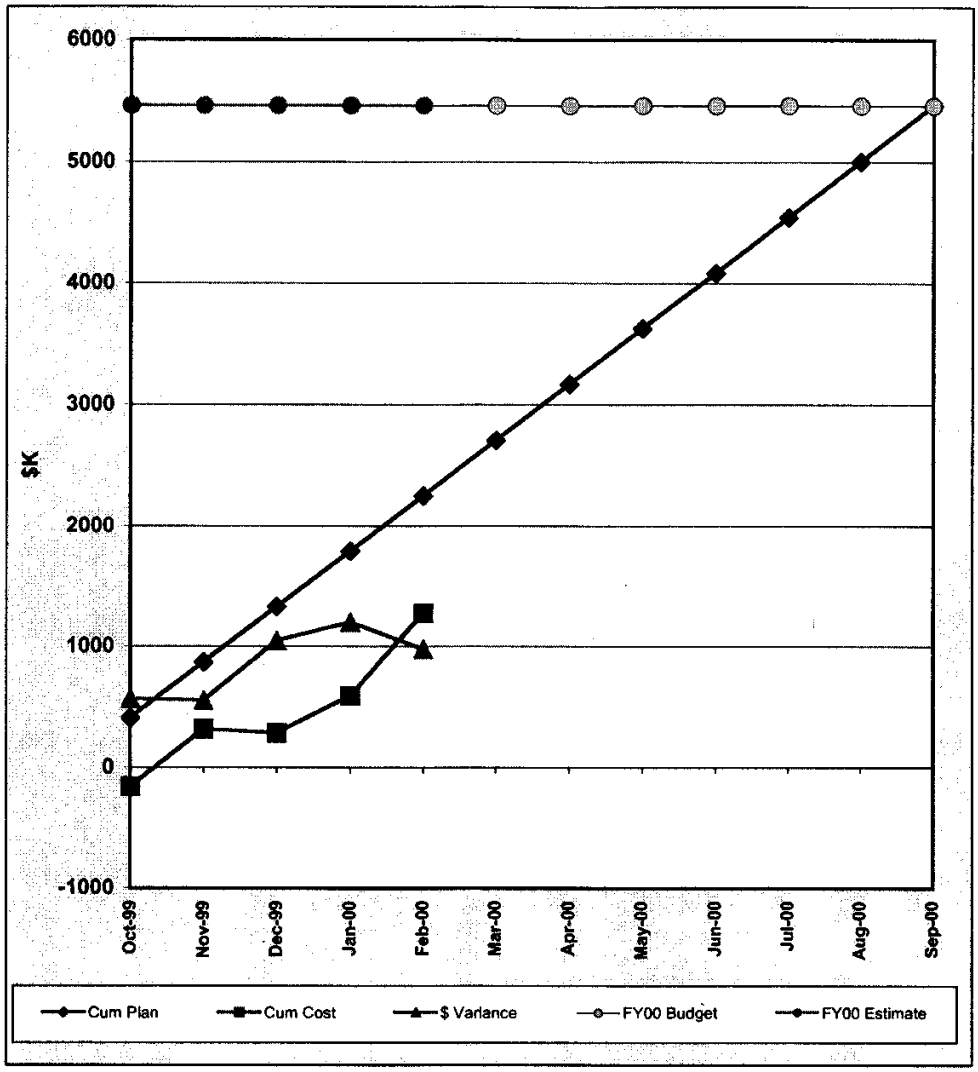
FY2000 Cost Plan to Actual
as of February 2000
WBS 1.11 ($K)

Project Number 96-D-111
February 2000



Month	Monthly		Cumulative				FY2000	FY2000
	Planned*	Actual	Planned	Actual	$ Var	% Var	Budget*	Estimate
Oct-99	410	-157	410	-157	567	138%	5,466	5,466
Nov-99	460	474	870	317	553	64%	5,466	5,466
Dec-99	460	-33	1,329	284	1,046	79%	5,466	5,466
Jan-00	460	306	1,789	589	1,200	67%	5,466	5,466
Feb-00	460	682	2,248	1,272	977	43%	5,466	5,466
Mar-00	460		2,708				5,466	
Apr-00	460		3,168				5,466	
May-00	460		3,627				5,466	
Jun-00	460		4,087				5,466	
Jul-00	460		4,546				5,466	
Aug-00	460		5,006				5,466	
Sep-00	460		5,466				5,466	

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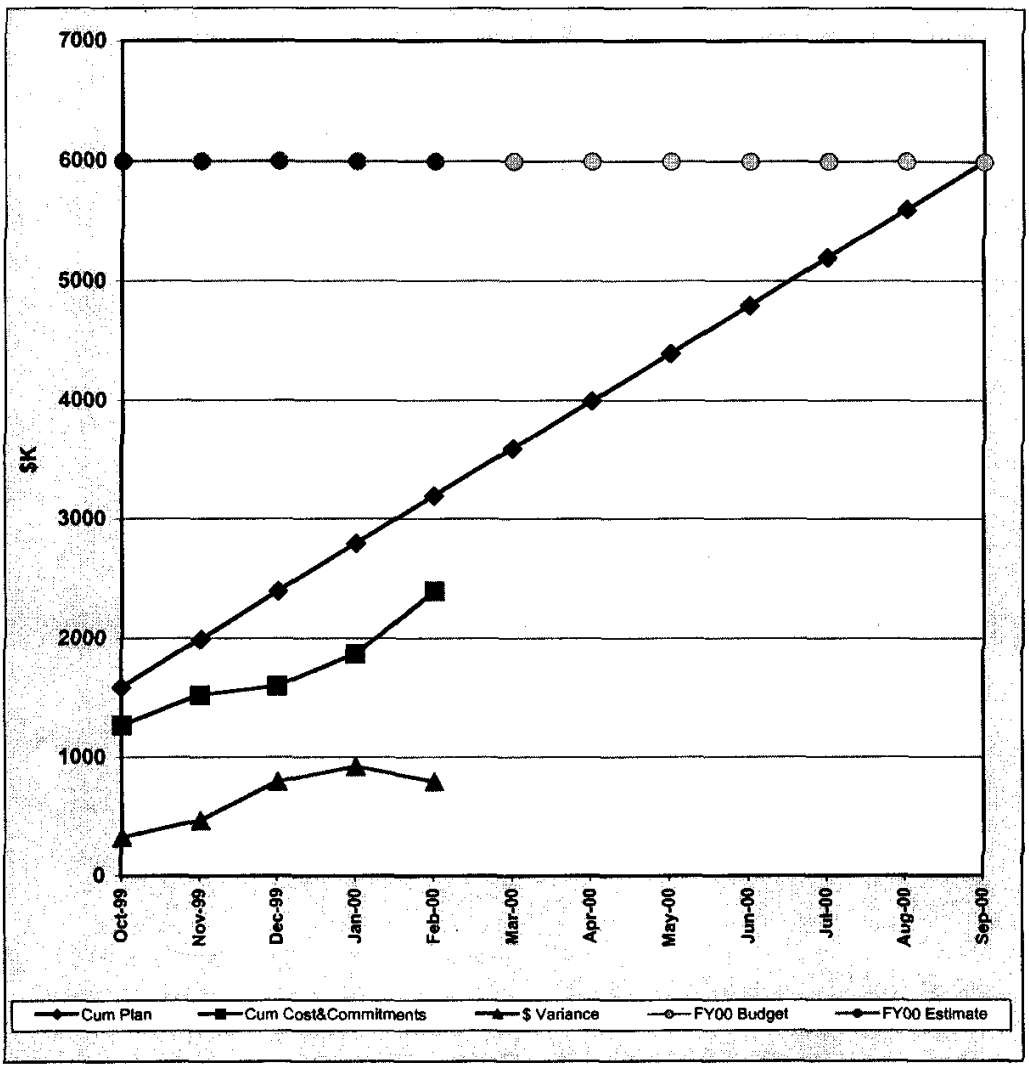
FY2000 Cost and Commitment Plan to Actual
as of February 2000
WBS 1.11 ($K)

Project Number 96-D-111
February 2000



	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	1,592 *	1,269	1,592 *	1,269	323	20%	5,993	5,993
Nov-99	400	256	1,992	1,525	467	23%	5,993	5,993
Dec-99	400	73	2,392	1,598	794	33%	5,993	5,993
Jan-00	400	271	2,792	1,869	923	33%	5,993	5,993
Feb-00	400	526	3,192	2,396	797	25%	5,993	5,993
Mar-00	400		3,593				5,993	
Apr-00	400		3,993				5,993	
May-00	400		4,393				5,993	
Jun-00	400		4,793				5,993	
Jul-00	400		5,193				5,993	
Aug-00	400		5,593				5,993	
Sep-00	400		5,993				5,993	

* includes $1,423K of uncosted obligations from FY99.

FY00 NIF Contingency Log - as of February 2000 ($BA)

Month	Request #	WBS element	Total	Contingency
Oct-99	BCP00-002	1.2.2.1	$ 725,200	$ 29,948,388
	CTR319	1.8.7	$ 65,000	$ 29,883,388
	CTR323	1.2.2.4.9	$ 185,000	$ 29,698,388
	ECR1072	1.4.1	$ 26,800	$ 29,671,588
	ECR1120	1.4.1.3	$ 28,800	$ 29,642,788
		1.4.3.2	$ 67,200	$ 29,575,588
	ECR1124	1.3.2.6	$ 3,700	$ 29,571,888
	ECR410	1.4.1.2	$ 468,000	$ 29,103,888
		1.4.4.1	$ (683,200)	$ 29,787,088
Nov-99	BCP00-005	1.3.4	$ (1,812,000)	$ 31,599,088
	BCP00-007	1.2.2.1	$ 100,000	$ 31,499,088
		1.2.2.4.9	$ 1,200,000	$ 30,299,088
	BCP00-008	1.3.2	$ 846,000	$ 29,453,088
	BCP00-009	1.3.2	$ 2,389,600	$ 27,063,488
	CTR324	1.2.2.4.6	$ 100,000	$ 26,963,488
	CTR325	1.2.2.4.4	$ 76,000	$ 26,887,488
	CTR327	1.3.2	$ 195,000	$ 26,692,488
	CTR328	1.2.2.4.6	$ 118,000	$ 26,574,488
	CTR330	1.4.3.1	$ 375,000	$ 26,199,488
	CTR331	1.2.2.4.9	$ 198,000	$ 26,001,488
	ECR1166	1.9.2	$ 5,000	$ 25,996,488
Dec-99	BCP00-010	1.4.5.1	$ 800,000	$ 25,196,488
	CTR332	1.2.2.4.9	$ 250,000	$ 24,946,488
	CTR336	1.2.2.4.6	$ 156,000	$ 24,790,488
	CTR338	1.2.2.4.5	$ 108,000	$ 24,682,488
	CTR340	1.2.2.4.6	$ 133,000	$ 24,549,488
	ECR1275	1.4.4	$ 250,000	$ 24,299,488
		1.8.4	$ 250,000	$ 24,049,488
Jan-00	BCP00-004	1.1.5	$ 362,500	$ 23,686,988
		1.4.1.2	$ 100,000	$ 23,586,988
		1.5.4.1	$ 10,000	$ 23,576,988
		1.7.1.4	$ 95,000	$ 23,481,988
	BCP00-006	1.4.2.4	$ 609,000	$ 22,872,988
	CTR344	1.4.4.2	$ 311,000	$ 22,561,988
	ECR1316	1.2.2.1	$ 20,000	$ 22,541,988
		1.2.2.4.9	$ 15,000	$ 22,526,988
	ECR1356	1.4.1.3	$ 69,300	$ 22,457,688
	ECR1357	1.4.1.3	$ 94,900	$ 22,362,788
	ECR1364	1.3.2	$ 4,000	$ 22,358,788
Feb-00	BCP00-011	1.4.3.2	$ 2,600,000	$ 19,758,788
	CTR335	1.1.4	$ 185,000	$ 19,573,788
	CTR343	1.2.2.4.6	$ 250,000	$ 19,323,788
	CTR345	1.2.2.4.9	$ 88,000	$ 19,235,788
	CTR346	1.2.2.1	$ 125,000	$ 19,110,788
	CTR349	1.2.2.4.6	$ 450,000	$ 18,660,788
	CTR350	1.2.2.4	$ 302,000	$ 18,358,788
	ECR1408	1.4.4.3	$ 50,000	$ 18,308,788

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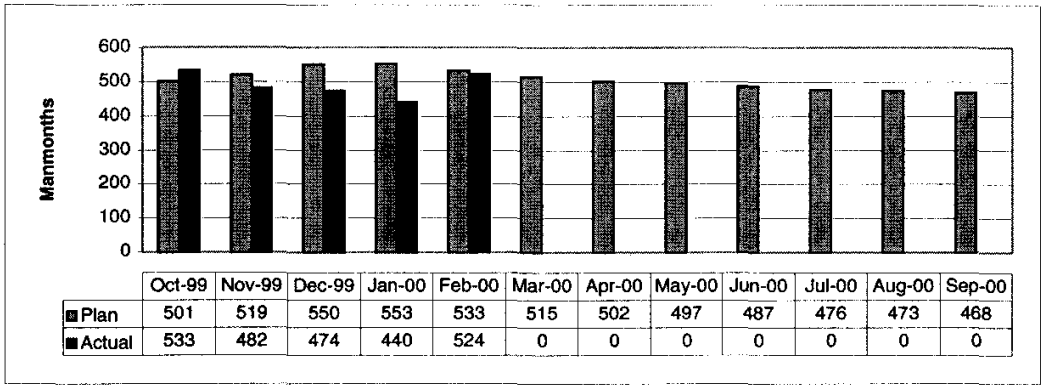
FY00 - Manpower Plan to Actual by Month*
as of February 2000
(LLNL and Supplemental Labor Manmonths)



	Oct-99	Nov-99	Dec-99	Jan-00	Feb-00	Mar-00	Apr-00	May-00	Jun-00	Jul-00	Aug-00	Sep-00
Plan	501	519	550	553	533	515	502	497	487	476	473	468
Actual	533	482	474	440	524	0	0	0	0	0	0	0

* FY00 manpower plan will be in draft until the rebaselining effort is complete and the FY00 *Cost Account Plans are approved.*